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**BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING  
COMMITTEE**

IN THE MATTER OF THE APPLICATION OF UNS  
ELECTRIC, INC., IN CONFORMANCE WITH THE  
REQUIREMENTS OF ARIZONA REVISED  
STATUTES §§ 40-360, *et seq.*, FOR A  
CERTIFICATE OF ENVIRONMENTAL  
COMPATIBILITY AUTHORIZING THE  
CONSTRUCTION OF THE VAIL TO VALENCIA  
115kV to 138kV TRANSMISSION LINE UPGRADE  
PROJECT, ORIGINATING AT THE EXISTING VAIL  
SUBSTATION IN SEC. 4, T.16S., R.15E., PIMA  
COUNTY, TO THE EXISTING VALENCIA  
SUBSTATION IN SEC. 5, T.24S., R.14E., IN THE  
CITY OF NOGALES, SANTA CRUZ COUNTY,  
ARIZONA.

) Arizona Corporation Commission

) Docket No. L-00000F-09-0190-00144

) Case No. 144

) **NOTICE OF FILING**

) **E-MAIL COMMUNICATION**

The Chairman of the Arizona Power Plant and Transmission Line Siting Committee is providing notice of filing the attached e-mail communications that have occurred between the Parties to this case and the Chairman, up to this date, since the last filing on May 29, 2009.

Arizona Corporation Commission

**DOCKETED**

JUN 10 2009

DOCKETED BY

DATED: June 10, 2009

  
John Foreman, Chairman  
Arizona Power Plant and Transmission  
Line Siting Committee  
Assistant Attorney General  
[john.foreman@azag.gov](mailto:john.foreman@azag.gov)

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1 Pursuant to A.A.C. R14-3-204,  
2 The Original and 25 copies were  
3 filed June 10, 2009 with:

4 Docket Control  
5 Arizona Corporation Commission  
6 1200 W. Washington St.  
7 Phoenix, AZ 85007

8 Copy of the above was mailed  
9 this 10<sup>th</sup> day of June, 2009 to:

10 Charles Hains  
11 Janice Alward, Chief Counsel  
12 Arizona Corporation Commission  
13 1200 West Washington Street  
14 Phoenix, AZ 85007  
15 Counsel for Legal Division Staff

16 Jason D. Gellman  
17 J. Matthew Derstine  
18 Roshka DeWulf & Patten, PLC  
19 One Arizona Center  
20 400 East Van Buren Street, Suite 800  
21 Phoenix, AZ 85004  
22 Counsel for Applicant, UNS Electric

23 Marc Jerden  
24 Tucson Electric Power Company  
25 Legal Department  
26 One South Church Avenue, Suite 200  
P. O. Box 711  
Tucson, AZ 85702-0711

Marshall Magruder  
P.O. Box 1267  
Tubac, AZ 85646

1 Elizabeth Buchroeder-Webb  
2 17451 East Hilton Ranch Road  
3 Vail, AZ 85641

4 Marta T. Hetzer  
5 Arizona Reporting Service, Inc.  
6 2200 North Central Avenue  
Phoenix, Arizona 85004-1481

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**From:** "Mary Ippolito" <mippolito@rdp-law.com>  
**To:** "Marshall Magruder" <mmagruder@earthlink.net>, "E Webb" <vailaz@hotmail....>  
**Date:** 5/29/2009 12:41 PM  
**Subject:** RE: Filings with ACC Tucson today

Thank you.

Mary Ippolito  
Roshka DeWulf & Patten PLC  
400 East Van Buren, Suite 800  
Phoenix, Arizona 85004  
(602) 256-6100 telephone  
(602) 256-6800 fax  
mippolito@rdp-law.com

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From: Marshall Magruder [mailto:mmagruder@earthlink.net]  
Sent: Friday, May 29, 2009 12:01 PM  
To: Mary Ippolito; E Webb; Tara Williams(ATGen); Matt Derstine; Jason D. Gellman  
Subject: Filings with ACC Tucson today

In a few hours, before 2 PM to catch the State shuttle to Phoenix by 2 PM, I will file the following:

- (1) DRAFT CEC (clean, condensed, and redlined)
- (2) Magruder Witness Summary with 10 exhibits.

Attached to this email are (1) and (2). Exhibits in separate email(s)

If there are any problems please let me know.

Marshall Magruder  
PO Box 1267  
Tubac, AZ 85646  
marshall@magruder.org  
520.398.8587

BEFORE THE ARIZONA POWER PLANT AND  
TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF UNS  
ELECTRIC, INC. FOR A CERTIFICATE OF  
ENVIRONMENTAL COMPATIBILITY FOR THE  
VAIL TO VALENCIA 115 KV TO 138 KV  
TRANSMISSION LINE UPGRADE PROJECT,  
ORIGINATING AT THE EXISTING VAIL  
SUBSTATION IN SEC. 4, T.16S., R.15E., PIMA  
COUNTY, TO THE EXISTING VALENCIA  
SUBSTATION IN SEC. 5, T.24S., R.14E., IN THE  
CITY OF NOGALES, SANTA CRUZ COUNTY,  
ARIZONA.

Docket No. L-00000F-09-0190-00144

Case No. 144

WITNESS SUMMARY  
FOR MARSHALL MAGRUDER

29 May 2009

Submitted to the Arizona Power Plant and Transmission Line Siting Committee and parties in  
accordance with Procedural Orders of 27 April 2009 and 20 May 2009 for Line Siting Case No. 144.

Personal Background.

I am Marshall Magruder, from Tubac, Arizona, UNS Electric ratepayer. Having served on the  
Santa Cruz County/City of Nogales Joint Energy Commission, I have gained a detailed understanding  
of our county's electricity utilities. My resume is an Attachment, but my "Large systems" systems  
engineering experience, gives a unique perspective. Many consider system engineers as best of  
breed. We usually are the first to really look at the "need" for a system. I've lead many requirements  
analysis teams to determine what is necessary to solve somebody's problem. Finding the "best"  
solution is what systems engineers do for a living. It takes several approaches before the "best" is  
found. We say it's really not designed until Rev C, the fourth revision. We "bracket and half",  
overshoot, and then undershoot, decreasing error each time. No one knows the "best" solution in  
isolation. Only when teams, an integrated product team (IPT), with all disciplines represented, such as  
your committee, can all the necessary environmental factors are put on the table. Reviewed and  
analyzed, then synthesized into a Product or Project. The "total environmental" requirements for this  
committee are about a broad a term as possible.

Background of a Project Review.

All factors need review. This Committee would not exist if human judgments were not required to  
assess the many unknown impacts. The A.R.S. 40-360 statutes specify a committee from various  
backgrounds. Some factors aren't included; others may not be key players in every decision. For  
years, I had psychologists on my projects, because they come from a different discipline, with

1 different and diverse points of view, and usually are the best at understanding how "people" will  
2 change or should use the "system." In fact, many systems are redesigned if this discipline is not  
3 property employed at the "needs assessment" phase of requirements analysis. Another key discipline  
4 is reliability engineering, the engineering specialist critical to "keep it operating". Through simple, well  
5 sometimes rather complex, through probability analysis, failures are predicted and sequenced, as  
6 they cascade through a system. We do this over and over again, changing the design, so that high  
7 failure items always have redundancy designed into the system. Use of mean time between failure  
8 and mean time to repair permits one to estimate rather closely when a system will fail and usually  
9 what component will fail first. Usually, that "first to fail" component is redesigned so a new "first to fail"  
10 component emerges. And we repeat that process again. Reliability engineering is not used in the  
11 electric utility industry, other than at nuclear power plants, probably because of the heavy influence of  
12 Admiral Rickover trained nuclear engineers who are top-notch professionals.

#### 13 Issues Related to the Project.

14 For the "Vail-Valencia 138 kV upgrade", I am not yet convinced a "need" really exists, nor if the  
15 WAPA to TEP transmission services change is "best" for Santa Cruz County ratepayers.

16 The major concern is changing the northern terminal for the transmission line from the WAPA  
17 Nogales Tap to the TEP Vail Substation. DOES this really benefit for Cruz County ratepayers in terms  
18 of economic, energy (electricity) and total environmental factors.

19 At this stage, with discovery questions not been fully answered, I'm unsure about the "need" and  
20 cost-benefit for customers this project.

21 Some questions I plan to explore during witness cross-examination include:

- 22 1. The Application seems to indicate that WAPA has a 50.9 MW "constraint" on providing electricity  
23 to the Nogales Tap. In response to my Data Request 1.1, the Company's report stated that after  
24 December 2008, an upgrade in the WAPA transmission line would add a tap at the Pantano  
25 substation that increases this "constraint" to 65.8 MW. (Exhibit MM-1, DR 1.1 response)
  - 26 a. What is the WAPA constraint?
  - 27 b. How does this constraint change?
  - 28 c. What is the impact of EPA of 2005, section 1221, which provided up to \$500 million annually  
29 for 5 years to remove WAPA transmission constraints?
  - 30 d. What is WAPA's future plans for the Sahuaro-Pantano 115 kV line?
  - 31 e. When has 50.9 MW actually been the maximum power delivered by WAPA?
  - 32 f. How much does WAPA charge to use its transmission system, e.g., the wheeling charges in  
33 \$ per kW-month?
- 34 2. What are the differences between using the Nogales Tap and Vail substations?
  - 35 a. What are the respective transmission line charges, and the differences impact on  
36 ratepayers? [TEP was \$2.33/kW-month in 2001]
  - 37 b. What are the transmission (energy) losses differences on each transmission system? [WAPA  
38 was approximately 4.95% in 2001, Nogales Tap to delivery was approximately 10.45%]

- c. What equipment owed by UNS Electric at the Nogales Tap will not be used after a potential transfer to Vail and what is its cost? [\$2.1M switch Exhibit MM-2]
  - d. How much new equipment will be required at Vail to support UNS Electric and what is its cost?
  - e. Can the Citizens' installed three-ring bus switch be used by changing from Apache to Vail, with an inline 115:138 kV transformer, so that both the Nogales Tap and Vail substations can provide two different power sources to support UNS Electric? (Exhibit MM-2)
3. Do these poles really require replacement? (Exhibit MM-3)
    - a. Has the company tested these poles to determine if they require replacement?
    - b. What do the UNSE statistics on pole failure on this line indicate? (DR refused)
    - c. What are the reliability statistics on this transmission line? (DR refused)
    - d. What are the new objective reliability measures that show the improvement before and after pole replacement? (DR refused)
    - e. What will be the change in total capacity of the 138 kV compared to the existing 115 kV? [Present line thermal limit is 132 MW except at southern end, new 138kV has 120 MW capacity => no change] (Exhibit MM-4)
    - f. Validation of Peak Demand forecasts for SCC. (Exhibits MM-5, MM-6, and MM-7)
    - g. What and where will the conductor be replaced?
    - h. Where will the existing poles and acquired right-of-way not be adequate for pole replacement?
    - i. Where will cor-ten poles and dulled galvanized steel poles be sited?
  4. What are the UNS Electric Renewable Energy Transmission Project's impact on the WAPA 115 kV line to Nogales Tap? (Exhibit MM-8)
    - a. How will UNS Electric perform on this contract if there is no Nogales Tap?
    - b. How will the two 230 kV new WAPA lines plus the 230 kV line to Pantano impact Santa Cruz County?
    - c. If WAPA has adequate future supply adequate to meet the load demands, other than changing poles, is there any other reason for this project (other than TEP receiving wheeling charges)?
  5. What are the plans for archeological and biologic professionals to survey for unexpected disturbance of archeological sites and plant life?
    - a. How will OHV traffic on maintenance roads be curtailed?
    - b. How will construction and restoration be performed to return the disturbed lands back to its original conditions?
  6. Will there be any public process or dialog occurring after the CEC is granted?
    - a. Will there be different groups for the UNSE and TEP customers?
    - b. Where and how frequent will these briefing and discussion sessions occur?
    - c. Will they be open, advertized, and make public?
    - d. Does the company see that such meetings can improve its image?
    - e. Will a website and any newsletter be used after CEC approval?
  7. How much will this project really cost?
    - a. What are the component costs for each segment?
    - b. Where will you deviate from the existing 100-foot wide ROW, when replacing poles?
    - c. On new ROW, how close will your 100-foot wide ROW be with respect to the UPRR ROW, in other words, is your ROW directly adjacent to the RR?

Prefiled Testimony.

My Prefiled Direct Testimony is planned to provide the background and discuss these and related issues but, in general, most of these questions are planned for cross-examination. It will not be ready until AM Monday and will be put into the "box" for each Committee person staying at the Rio Rico Esplendor Hotel by noon and available by 0800 on 2 June for others.

Exhibits.

Exhibits in this Summary are to be provided before the hearing to the Committee and parties.

Pre-Filed Exhibits (all have been provided to the Applicant)

- MM-1 UniSource Energy Services – UNS Electric (Santa Cruz) System Conversion from Point-to-Point to Network Integrated Transmission Service, 22 May 2008 (in DR 1-1 response)
- MM-2 Citizens Plan of Action Excerpt (sent to UNSE via email)
- MM-3 Article from T&D on Pole Replacement practices (provided as a handout 26 May)
- MM-4 Excerpt from Magruder Testimony 8 July 2005 (conductor capacities)
- MM-5 Peak Demand Forecasts for Santa Cruz County (various sources since 2000)
- MM-6 UES Loads and Resources Peak Demand Forecast (UES website)
- MM-7 Santa Cruz Generation Forecasts 2008-2028 (UES website)
- MM-8 UES Letter to WAPA Transmission Infrastructure Program (p. 30-36) (in DR 1-3 response)
- MM-9 SWTC Substation ID Info
- MM-10 Magruder Witness Summary (this document less other exhibits)

Mailed to all parties and DATED this 29th day of May 2009.

Respectfully submitted,

Marshall Magruder  
PO Box 1267  
Tubac, AZ 85646  
[marshall@magruder.org](mailto:marshall@magruder.org)  
520.398.8587

Attachments

A. Resume of Marshall Magruder

**Service List**

Docket Control (Original and 25 copies)	400 East Van Buren Street, Suite 800
Arizona Corporation Commission	Phoenix, Arizona 85004
1200 West Washington Street	Marc Jerden
Phoenix, Arizona 85007	Tucson Electric Power Company, Legal Department
Charles Hains, Janice Alward, Chief Counsel	One South Church Avenue, Suite 200
Arizona Corporation Commission	PO Box 711
1200 West Washington Street	Tucson, Arizona 85702-0711
Phoenix, Arizona 85007	Elizabeth Buchroeder-Webb
Jason D. Gellman, J. Matthew Derstine	17451 East Hilton Ranch Road
Roshka DeWulf & Patten, PLC	Vail, Arizona 85641
One Arizona Center	



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## Attachment A

### RESUME OF MARSHALL MAGRUDER

#### EDUCATION

MS in Systems Management, University of Southern California (1981); MS in Physical Oceanography, Naval Postgraduate School (1970); BS, US Naval Academy (1962)

#### EXPERIENCE

Over 25 years as Systems Engineer associated contractor, consultant, Raytheon-Hughes in systems engineering, training and naval systems, C4I simulation and modeling; over 40 years experience with 25 years US Navy

□ **Large-system development** at all levels

**From** pursuit, analysis, winning strategy, Request for Proposal evaluation, proposal management, system requirements analysis, architectures, specifications, design synthesis, trade-off studies, requirements allocation tracking,

**To** system, level test planning, deployment, implementation, through sign-off,

**For** technical systems of all complexities.

□ **Developed** Antisubmarine Warfare, Electronic Warfare, Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance operational concepts, procedures, and tactical employment.

□ **Used, operated, and planned** Navy, Army, Air Force, Coast Guard, Joint systems, world-wide.

□ **Coordinated multi-platform employment** from sensor to tactical platform to Battle Force to Theater levels.

□ **Qualified systems engineer-manager** for trainers, artillery, Command & Control, countermeasures, any platform.

□ **Specialties:** environmental analysis, documentation, sensor/weapon predictions, C4ISR, Electromagnetic and Emission Control (EMCON) decision criteria.

□ **Battle Force/Group Tactical Action Officer** on 8 aircraft carriers, TAO Instructor, 20 months combat.

#### RECENT POSITIONS

**Commissioner, Santa Cruz County/City of Nogales Joint Energy Commission** (2001-2008), intervened in Line Siting Case No. 111 and 144; Rate Cases (two Natural Gas, one Electric, one Water), Renewable Energy Standard participation, and various other ACC issues.

**C4I Architect and C4I Support Plan Lead** for the Carrier for the 21st Century (CVX) Delivery Task.

- Completed CVX *C4I Support Plan, v1.0*, Joint Operational Architecture development for Joint and Naval staff space allocations for CVX (1999) and Joint Command and Control ship (2002).
- Drafted CVN 77 *Electronics System Integrator Statement of Work* for WBS Group 400 tasks and IPTs (1999), *Integrated Management Plan*;
- **Royal Navy Future Aircraft Carrier** WBS proposal (2002)

**Lead Systems Engineer, Operations Analyst and Site Survey Leader** for Saudi Arabian Minister of Defense National Operational Command Centers and C4I System (completed August 1997).

- Completed *System Specification, System Description Document, Site Survey, Interface Requirements Documents*

**Proposal Technical Volume Manager** for the following **winning proposals**:

- **Vessel Traffic Service 2000 system**, US Coast Guard command center for surface surveillance using radar, visual, communications links. (evaluated A++, won Phase I, Phase II delayed then restructured)
- **Anti-submarine Warfare Team Trainer** (Device 20A66), an integrated, multi-ship, submarine and aircraft training system for Naval Task Groups. (\$56M contract, best technical, lowest cost)
- **Electronic Warfare Coordination Module**, an Intelligence/EW spectrum planning and management system for Task Force Command Centers. (won Phase I, best technical)

**Program Manager for the Border Patrol Strategic Border Initiative and National Training Center** (2008)

- Training Standards for Border Patrol personnel performing maintenance on Virtual Fence equipment, establish a National Border Patrol Training Center with interactive and life-time Performance Measurement

Subsystem, for maintenance and operational personnel.

**Assistant Program Manager for the Training Effectiveness Subsystem, Device 20A66**

- Performance Measurement Subsystem, observed real-time performance of operators, teams, multi-ship and aircraft units during exercises and compared to the standard

**Senior Systems Engineer** responsible for writing **specifications** in following **proposals**:

- **Fire Support Combined Arms Team Trainer** *System Specification*, a US Army field artillery multiple cannon and battery training system. (awarded \$118M contract, still under contract)
- **Warfighter's Simulation 2000** (WARSIM 2000) *System Specification*, a US Army Force XXI Century battalion to theater levels, training system with actual C4I systems. (won Phase I)
- **US Navy Tactical Combat Training System**, *Exercise Execution Software Requirements Specification* for simulation and computer models to run real-time, driving sensors, weapons and links on 35 ships, 100 aircraft and submarines (won Phase I contract, wrote SRS in Phase 2 proposal)
- **US Army Virtual Proving Ground (VPG)** - Performed *C4ISR Architecture Framework* development, implementation and documentation using the *DoD Architecture Framework*, for Operational, Technical and Systems architecture products. (2001-2002).
- **MBA Instructor, University of Phoenix**, for "Operations Management for Total Quality" and "Managing R&D and Innovation Processes" courses.

**January 1998 to present – H&R Block, Senior Tax Advisor Level III**, seasonal tax preparer (January to April 15), part time, **AARP Tax Consulting for the Elderly** (pro bono) tax preparer, IRS qualified.

**Networthiness Certification (Jan. 2005-2007)**, prepared proposal for the Army Network Command (NETCOM), for this several million-dollar program involving over 3,200 Army computer programs at all Army installations, worldwide. Prepared Quality Control and Risk Management Plan.

**Cryptologic Support and Logistic Analysis (Oct. 2004-2006)**, prepared proposal for Army Communications-Electronics Command, Ft. Huachuca, Arizona.

**Proposal Manager, Law Enforcement Driver Trainer System for California.**

Led pre-proposal and proposal team to develop a design for high-technology driver trainer systems for the Peace Officers and Safety Training (POST) Commission. (Hughes won)

**AWARDS**

Arizona Golden Rule Citizen Award, by Arizona Secretary of State Janice K. Brewer for exemplifying the spirit of the Golden Rule daily: "treat others the way you would like to be treated", nomination made by Santa Cruz County Supervisor Ron Morris, of August 2004 for accomplishments on the Santa Cruz County/City of Nogales Joint Energy Commission.

Merit Award, Raytheon and Hughes, four times, for achievement and excellence in performance.

National Security Industrial Association (NSIA) Anti-Submarine Warfare Committee, Meritorious Award from the NSIA President, Admiral Hogg USN (ret), for leading ASW training industry and government studies. (1992)

Military Awards include Meritorious Service Medal, Naval Commendation Medal with Combat "V" and Gold Star, Navy Unit Commendation, Navy Meritorious Unit Commendation, National Defense Medal, Armed Forces Expeditionary Medal (Dominican Republic), Vietnam Service Medal with three Bronze Stars, Vietnam Campaign Medal with "1960-", Overseas Service Ribbon (Italy).

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10 **Exhibits**

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**BEFORE THE ARIZONA POWER PLANT AND  
TRANSMISSION LINE SITING COMMITTEE**

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IN THE MATTER OF THE APPLICATION OF  
UNS ELECTRIC, INC. FOR A CERTIFICATE  
OF ENVIRONMENTAL COMPATIBILITY  
FOR THE VAIL TO VALENCIA 115 KV TO  
138 KV TRANSMISSION LINE UPGRADE  
PROJECT, ORIGINATING AT THE EXISTING  
VAIL SUBSTATION IN SEC. 4, T.16S., R.15E.,  
PIMA COUNTY, TO THE EXISTING  
VALENCIA SUBSTATION IN SEC. 5, T.24S.,  
R.14E., IN THE CITY OF NOGALES, SANTA  
CRUZ COUNTY, ARIZONA.

Docket No. L-00000F-09-0190-00144

Case No. 144

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**CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY**

Pursuant to notice given as provided by law, the Arizona Power Plant and Transmission  
Line Siting Committee (the "Committee") held public hearings on June 2, 3, 4, 2009 in Rio Rico,  
all in conformance with the requirements of Arizona Revised Statutes ("A.R.S.") § 40-360, *et*  
*seq.*, for the purpose of receiving evidence and deliberating on the Application of UNS Electric,  
Inc. ("Applicant"), incorporated herein, for a Certificate of Environmental Compatibility ("CEC")  
in the above-captioned case (the "Project").

The following members and designees of members of the Committee were present at one  
or more of the hearings for the evidentiary presentations and/or for the deliberations:

John Foreman

Chairman, Designee for Arizona Attorney General  
Terry Goddard

David B. Bernhart, P.E.

Designee for Chairman, Arizona Corporation  
Commission

Paul Rasmussen

Designee for Director, Arizona Department of  
Environmental Quality

Jessica Youle

Designee for Director, Energy Department, Arizona  
Department of Commerce

Jeff Maguire

Appointed Member

Bill Mundell

Appointed Member

Patricia Noland

Appointed Member

Michael Palmer Appointed Member

Michael Whalen Appointed Member

Barry Wong Appointed Member

The Applicant was represented by J. Matthew Derstine and Jason D. Gellman of Roshka, DeWulf & Patten, PLC, and Marcus G. Jerden of UniSource Energy Corporation.

The following parties were granted intervention pursuant to A.R.S. § 40-360.05: Marshall Magruder and Elizabeth Webb, both in pro persona.

At the conclusion of the hearings, the Committee, having received the Application, the appearances of the parties, the evidence, testimony and exhibits presented at the hearings, and being advised of the legal requirements of A.R.S. §§ 40-360 to 40-360.13, upon motion duly made and seconded, voted X to X to grant the Applicant this CEC (Case No. 144) for the Project to rebuild the existing 115 kV transmission line as a 138 kV transmission line and interconnect that transmission line to the Vail Substation as set forth in the Application.

The Project as approved consists of approximately 57.8 miles of 138 kV transmission line and ancillary facilities along the route as described below. The Project starts at the Vail Substation, and ends at the Valencia Substation. A legal description and general location map of the Project is attached as Exhibit A.

As explained in the Project Application, the Project will:

- Interconnect the northern end of the line with the Vail 345/138 kV Substation instead of the Nogales Tap.
- Upgrade the line voltage from 115 kV to 138 kV.
- Replace wooden H-frame structures with steel monopoles.

As explained in the Project Application, the Project Alignment (the route granted for the Project in this CEC), consisting of a 500-foot-wide planning corridor except where noted, and as further described in attached Exhibit A and the Application, is as follows: The Project Alignment originates from the Vail Substation in Section 4, Township 16 South, Range 15 East. The Project Alignment then extends westerly parallel to TEP's Vail-Robert Bills (138 kV) and Vail-Irvington (138 kV) lines along an access road which is an east extension of the Old Vail Connection Road

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1 to where Old Vail Connection Road intersects Wilmot Road (2.3 miles). At this intersection, the  
2 Alignment turns south extending to the Nogales Tap and interconnects to the existing line (1.5  
3 miles). From that interconnection, the alignment then continues south to the Kantor Substation  
4 (27.8 miles) utilizing the existing line that was previously rebuilt in accordance in the Application  
5 in Line Siting Case No. 78 and approved in Decision No. 56097 (July 6, 1988). No  
6 improvements, pole replacements, or construction are necessary therein and the existing line in  
7 this portion is hereby designated for operation at 138 kV.

8 The Project Alignment leaves the Kantor Substation southerly along the foothills of the  
9 Santa Rita Mountains east of the Santa Cruz River. South of Josephine Canyon, the Project  
10 Alignment drops out of the foothills and into the Santa Cruz River Valley (11.8 miles). To this  
11 point from the Nogales Tap the Project Alignment follows the alignment for the existing 115 kV  
12 transmission line. North of the intersection of that existing 115 kV transmission line alignment  
13 and Pendleton Drive, the Project Alignment deviates from the existing 115 kV transmission line  
14 alignment and shifts 0.2 miles to the easterly edge of the UPRR right-of-way.

15 The Project Alignment then continues paralleling the UPRR right-of-way to the Cañez  
16 Substation (1.8 miles), and then continuing southerly adjacent to the UPRR in the Santa Cruz  
17 River Valley (3.4 miles). Near the intersection of Pendleton Drive and Avenida Coatimundi, the  
18 alignment shifts from the UPRR right-of-way and parallels Avenida Coatimundi east to the  
19 Sonoita Substation (0.9 miles).

20 The Project Alignment extends southerly out of the Sonoita Substation along the existing  
21 line across Sonoita Creek and the Santa Cruz River to Old Tucson Road, and then parallels Old  
22 Tucson Road to a point near the intersection with Grand Avenue (5.9 miles).

23 At the intersection of Old Tucson Road and Grand Avenue, the line departs from the  
24 existing line to proceed east of and parallel to Grand Avenue on the east side of Nogales Wash  
25 through an industrial area (0.9 miles). The Project Alignment then returns to the existing line  
26 alignment near where Frank Reed Road intersects Grand Avenue, and continues south, along the  
27 west side of the Santa Cruz County Complex (0.8 miles) The Alignment then shifts east and

1 passes through the Preston Mobile Home Park (0.3 miles) with a 1250-foot-wide planning corridor  
2 for this course only.

3 The Project Alignment then turns to the south through the Mariposa Mall, across Mariposa  
4 Road, and through the Loma Linda Shopping Center (0.4 miles). The Project Alignment continues  
5 on the existing line's alignment and turns to the east, entering the Valencia Substation located in  
6 Section 5, Township 24 South, Range 13 East (0.4 miles).

7 The Project will replace the existing wooden H-frame structures with steel monopoles as  
8 described in the Application. Steel monopoles will also be used between Vail Substation and the  
9 Nogales Tap; the existing transmission line portion constructed pursuant to Line Siting Case No.  
10 78 is already on steel monopoles.

### 11 CONDITIONS

12 This Certificate is granted upon the following conditions:

- 13 1. The Applicant shall obtain all approvals and permits required by the United  
14 States, the State of Arizona, Pima County, Santa Cruz County, the City of  
15 Tucson, the City of Nogales, the City of Sahuarita, US Bureau of Land  
16 Management ("BLM") and any other governmental entities having jurisdiction  
17 necessary to construct the Project.
- 18 2. The Applicant shall comply with all existing applicable statutes, ordinances,  
19 county comprehensive plans, city/town general plans, master plans, project area  
20 development and subdivision plans, and regulations of the United States, the State  
21 of Arizona, Pima County, Santa Cruz County, the City of Tucson, the City of  
22 Nogales, the City of Sahuarita and any other governmental entities having  
23 jurisdiction during the construction and operation of the transmission line.
- 24 2A. Applicant shall construct the Project transmission lines only within the corridor  
25 more fully described in Exhibit A, attached hereto. [Case No. 111, Condition 3,  
26 ACC Decision 64356]
- 27 3. If any archaeological, paleontological or historical site or object that is at least  
fifty years old is discovered on federal, state, county or municipal land

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of Nogales the County of [county],

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of Nogales

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1 during the construction or operation of the transmission line, the Applicant  
2 or its representative in charge shall promptly report the discovery to the  
3 Director of the Arizona State Museum, and in consultation with the Director, shall  
4 immediately take all reasonable steps to secure and maintain the preservation of  
5 the discovery as required under A.R.S. § 41-844.

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- 6 4. If human remains and/or funerary objects are encountered on private land  
7 during the course of any ground-disturbing activities relating to the  
8 construction or operation of the transmission line, the Applicant shall cease work  
9 on the affected area of the Project and notify the Director of the Arizona State  
10 Museum as required under A.R.S. § 41-865.

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- 11 5. The Applicant shall comply with the notice and salvage requirements  
12 of the Arizona Native Plant Law (A.R.S. §§ 3-901 et seq. as applicable), County  
13 and municipal plant ordinances, and shall, to the extent feasible, minimize the  
14 destruction of native plants during the construction and operation of the  
15 transmission line.

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- 16 6. The Applicant shall not assign this Certificate or its interest in the Project  
17 authorized by this Certificate unless both Applicant (as Transferor/Assignor)  
18 and Transferee/Assigned has signed a "Notice of Transfer of Certificate of  
19 Environmental Compatibility" ("Notice") as required under A.R.S. § 40-  
20 300.08(A) and A.A.C. R14-3-213(F). That Notice must be filed in this  
21 Docket. Transferee/Assignee, as part of acquiring any interest in the Project,  
22 must agree to comply with all terms, limitations and conditions contained  
23 within this Certificate originally issued to Applicant by the Arizona Power  
24 Plant and Transmission Line Siting Committee and approved and/or issued by  
25 the Arizona Corporation Commission.

26 6A. Where appearing below, "Applicant" includes any assignees.

Deleted: without prior approval of the Commission. Any assignment of this Certificate shall require the assignee to assume all responsibilities of the Applicant listed in this Certificate.

- 27 7. This authorization to construct this Project shall expire five years from the date  
the Certificate is approved by the Commission unless the transmission line is

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capable of operation. However, prior to expiration, the Applicant will have the right to apply to the Commission for an extension of this time limitation up to six months prior to expiration. [Case No. 111, Condition 17 modified, ACC Decision 64356]

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8. In the event that the Project requires an extension of the term of this Certificate prior to completion of construction, Applicant shall use reasonable means to notify, including by first class mail, all landowners, neighborhood associations registered with the local governing jurisdiction, and residents within one mile of the Project corridor, all persons who made public comment at this proceeding, and all parties to this proceeding of the request, the date, time and place of the hearing in which the Commission will consider its request for extension. [CONDITION 7 IN CASE 137 DECISION NO. 70469]

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9. The Applicant shall make every reasonable effort to identify and correct, on a case-specific basis, all complaints of interference with radio or television signals from operation of the transmission lines and related facilities addressed in this Certificate. The Applicant shall maintain written records for a period of five years of all complaints of radio or television interference attributable to operation, together with the corrective action taken in response to each complaint. All complaints shall be recorded to include notations on the corrective action taken. Complaints not leading to a specific action or for which there was no resolution shall be noted and explained. A copy of these records will be provided to the ACC Staff, upon request.

10. Within 120 days of the Commission decision granting this Certificate, Applicant will post signs, at least 3-feet by 3-feet in size, in public rights-of-way giving notice of the Project corridor to the extent authorized by law. The Applicant shall place signs in prominent locations at reasonable intervals such that the public is notified along the full length of the transmission line until the transmission structures are constructed. To the extent practicable, within 45 days of securing easement or right-of-way for the Project, the Applicant shall erect and maintain signs providing public

notice that the property is the site of a future transmission line. The signs shall advise:

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- (a) That the site has been approved for the construction of Project facilities;
- (b) The expected date of completion of the Project facilities;
- (c) A phone number for public information regarding the Project;
- (d) The name of the Project;
- (e) The name of the Applicant; and
- (f) The website of the Project.

11. Applicant shall design the transmission lines to incorporate reasonable measures to minimize impacts to raptors.

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12. Applicant shall use non-specular conductors and with

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12A. A dulled surface color suitable for the terrain and vegetation [excerpt from Case No. 111, Condition No. 11(a)] will be used for transmission line structures with a goal that the visual contrast between the pole finish and background be minimized. After approval of the final alignment by the Committee, the applicant shall submit a Pole Plan within 30 days the proposed pole finish for each part of each segment to the parties. The criteria used shall be that poles in the open terrain shall have a dulled galvanized steel finish and when looking from where the greatest population would see these poles with a sky background. In areas where poles are sited where the greatest population having a terrain background behind the pole such as in a valley away from a road, then self-weathering finish will be satisfactory.

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12B. Applicant shall retain an archaeologist satisfactory to the State Historical Preservation Office (SHPO). The archaeologist shall be on site during construction activities where new routes are being developed to advise Applicant in connection with additional archeological and preservation efforts for archaeological sites that may be required and to manage cultural and historical preservation efforts for archaeological sites that may be affected by the construction of new transmission lines. The archeologist shall meet and confer with representatives of local American

Nations and historical societies to determine any sensitive areas and if and how they can be avoided or mitigated. [Case No. 111, Condition 8, Decision 64356]

12C. Applicants shall retain a biologist satisfactory to the Arizona Game and Fish Department. The biologist is to be on-site during construction activities in connecting with any additional biological and related studies that may be required and to advise Applicant in connection with mitigation efforts for any endangered, threatened and sensitive species that maybe affected by the construction of the project transmission lines. [Case No. 111, Condition 9, Decision 65356]

13. Before construction on this Project may commence, the Applicant shall file a construction Mitigation and Restoration Plan with AGC Docket Control and copies to all parties. Where practicable, the Plan shall specify the Applicant's plans for construction access and methods to minimize impacts to wildlife and to minimize vegetation disturbance outside of the Project right-of-way particularly in drainage channels and along stream banks and shall re-vegetate, unless waived by the landowner, native areas of construction disturbance to its preconstruction state outside of the power-line right of way after construction has been completed. The Plan shall specify the Applicant's plans for coordination with the Arizona Game and Fish Department and the State Historic Preservation Office. The Applicant shall use existing roads for construction and access where practicable and the Plan shall specify the manner in which the Applicant makes use of existing roads.

14. With respect to the Project, Applicant shall participate in good faith in state and regional transmission study forums to coordinate transmission expansion plans related to the Project and to resolve transmission constraints in a timely manner.

15. The Applicant shall provide copies of this Certificate to the City of Tucson, the City of Sahuarita, the City of Nogales, Pima County, Santa Cruz County, the Arizona State Land Department, the State Historic Preservation Office, and the Arizona Game and Fish Department.

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16. Prior to the date construction commences on this Project, the Applicant shall provide known homeowners and businesses, realtors, homebuilders, neighborhood associations registered with the local jurisdictions, and developers of record, within one mile of the center line of the Certificated Project Alignment the identity, location, and a pictorial depiction of the type of power line being constructed, accompanied by a written description, and encourage the developers and homebuilders to include this information in the developers' and homebuilders' homeowners' disclosure statements. [SEE CONDITION 6 IN CASE 137 DECISION NO. 70649].

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16A. Applicant shall, within one year of completion of the Project, rehabilitate to its original state any and all areas disturbed by construction of the Project, except for any road that maybe necessary to access the transmission lines for maintenance and repair. The goals of the Mitigation and Restoration Plan will be to avoid impacts where practicable; and where impacts are unavoidable, minimize impacts; and focus on site preparation to facilitate natural processes to revegetation. Other key elements of this Plan are to:

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- Emphasize final site preparation to encourage natural revegetation;
- Prohibit use of any non-native plants or seeds during revegetation;
- Save (i.e., reserve) where practical, mature native trees;
- Preserve topsoil and plant materials from the right-of-way before grading, and re-spread over the right-of-way after construction is complete;
- Imprint the restored right-of-way to provide indentations to catch seed and water;
- Implement best management practices to protect the soil;
- Apply restoration methods that have been shown to work in the desert environment;
- Prevent the spread of noxious weeds or other undesirable species; and
- Apply methods to discourage unauthorized off-highway-vehicle (OHV) use

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of the right-of-way for all segments. [Case No. 111, Condition 13, ACC  
Decision 64356]

17. Before commencing construction of Project facilities located parallel to and within  
100 feet of any existing natural gas or hazardous liquid pipeline, the Applicant  
shall:

- (a) Perform the appropriate grounding and cathodic protection studies to show  
that the Project's location parallel to and within 100 feet of such pipeline  
results in no material adverse impacts to the pipeline or to public safety  
when both the pipeline and the Project are in operation. If material adverse  
impacts are noted in the studies, Applicant shall take appropriate steps to  
ensure that such material adverse impacts are mitigated. Applicant shall  
provide a copy of all such studies to Commission Staff; and
- (b) Perform a technical study simulating an outage of the Project that may be  
caused by the collocation of the Project parallel to and within 100 feet of the  
existing natural gas or hazardous liquid pipeline. This study should either: i)  
show that such outage does not result in customer outages; or ii) include  
operating plans to minimize any resulting customer outages. Applicant shall  
provide a copy of this study to Commission Staff.

18. Applicant will comply the latest Western Electricity Coordinating Council/North  
American Electric Reliability Corporation Planning standards as approved by the  
Federal Energy Regulatory Commission, and National Electrical Safety Code  
construction standards.

19. The Applicant shall submit a self-certification letter annually, identifying progress  
made with respect to each condition contained in the Certificate, including which  
conditions have been met. Each letter shall be submitted to the Docket Control of  
the Arizona Corporation Commission and the parties on August 1 beginning in  
2010. Attached to each certification letter shall be documentation explaining how  
compliance with each condition was achieved. Copies of each letter along with the

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corresponding documentation shall be submitted to the Arizona Attorney General and Department of Commerce Energy Office. The requirement for the self-certification shall expire on the date the Project is placed into operation.

20. Within sixty (60) days of the Commission decision granting this Certificate, the Applicant shall make good faith efforts to commence discussions with private landowners, on whose property the Project Alignment is located, to identify the specific location for the Project's right-of-way and placement of poles.

21. The Applicant shall expeditiously pursue reasonable efforts to work with private landowners on whose property the Project right-of-way will be located, to mitigate the impacts of the location, construction, and operation of the Project on private land.

22. This Certificate recognizes that, as part of the Vail to Valencia 115 kV to 138 kV Transmission Line Upgrade Project, the existing line in Segment 1B will now operate at 138 kV.

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Deleted: The Certificate does not grant to the Applicant the right to construct a second circuit in Segment 1B – the existing line approved in Decision No. 56097 (July 6, 1988) on single steel poles that is currently operating at 115 kV. As explained in the Application under Line Siting Case No. 78, that line is designed to be able to operate at 138 kV.

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#### **FINDINGS OF FACT AND CONCLUSIONS OF LAW**

This Certificate incorporates the following findings of fact and conclusions of law:

1. The Project is in the public interest because it aids the state in meeting the need for an adequate, economical and reliable supply of electric power.
2. In balancing the need for the Project with its effect on the environment and ecology of the state, the conditions placed on the CEC by the Committee effectively minimize its impact on the environment and ecology of the state.
3. The conditions placed on the CEC by the Committee resolve matters concerning the need for the Project and its impact on the environment and ecology of the state raised during the course of proceedings, and as such, serves as the findings on the matters raised.
4. In light of these conditions, the balancing in the broad public interest results in favor of granting the CEC.

DATED this \_\_\_\_ day of \_\_\_\_\_ 2009.

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THE ARIZONA POWER PLANT AND  
TRANSMISSION LINE SITING COMMITTEE

Hon. John Foreman, Chairman

MAGRUDER DRAFT (REDLINES)

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## Exhibit A

A transmission line corridor, with the centerline, as determined from Arizona State Plane Coordinate mapping, more particularly described as follows:

Beginning at **Vail Substation**, at grid coordinate (X) 1041085.39, (Y) 391274.36, of Central Zone of Arizona State Plane Coordinate System 1983, and to which National Geodetic Survey point PUMP (PID - CZ0252) bears South 42 degrees 20 minutes 38 seconds West, 4,870.50 feet;

thence North 88 degrees 44 minutes 54 seconds West, 307.61 feet;

thence North 60 degrees 17 minutes 58 seconds West, 1,037.36 feet;

thence North 00 degrees 07 minutes 58 seconds West, 1,017.67 feet;

thence South 89 degrees 32 minutes 32 seconds West, 11,891.07 feet;

thence South 05 degrees 40 minutes 55 seconds West, 1,744.96 feet;

thence South 00 degrees 34 minutes 52 seconds East, 6,224.41 feet to a point in **Nogales Tap Substation**;

thence South 00 degrees 34 minutes 52 seconds East, 50,753.00 feet;

thence South 34 degrees 21 minutes 34 seconds West, 95,891.68 feet;

thence South 88 degrees 34 minutes 55 seconds West, 121.34 feet to a point in **Kantor Substation**;

thence South 03 degrees 13 minutes 57 seconds East, 158.25 feet;

thence South 21 degrees 14 minutes 55 seconds East, 22,453.78 feet;

thence South 00 degrees 29 minutes 36 seconds East, 9,011.69 feet;

thence South 19 degrees 02 minutes 40 seconds West, 1,725.59 feet;

thence South 00 degrees 29 minutes 28 seconds East, 12,408.16 feet;

thence South 12 degrees 35 minutes 44 seconds East, 2,722.98 feet;

thence South 00 degrees 28 minutes 50 seconds East, 13,826.04 feet;

thence South 56 degrees 02 minutes 44 seconds West, 1,101.12 feet to the beginning of a non-tangent curve concave to the southwest, having a radius of 5,853.84 feet, and to which a radial line bears North 47 degrees 56 minutes 45 seconds East;

thence southeasterly 2,370.68 feet along said curve through a central angle of 23 degrees 12 minutes 13 seconds;

thence South 18 degrees 52 minutes 02 seconds East, 5,858.00 feet to a point 172 feet westerly of the west side of **Cañez Substation**;

thence South 18 degrees 52 minutes 02 seconds East, 12,393.42 feet to the beginning of a curve concave to the northeast and having a radius of 5,553.78 feet;

thence southeasterly 3,974.97 feet through a central angle of 41 degrees 00 minutes 28 seconds;

1 thence South 59 degrees 52 minutes 30 seconds East, 1,369.94 feet;

2 thence North 64 degrees 22 minutes 52 seconds East, 1,337.41 feet to a point 63 feet southerly of the  
3 south side of **Sonoita Substation**;

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4 thence South 25 degrees 54 minutes 45 seconds East, 2,434.49 feet;

5 thence South 18 degrees 53 minutes 51 seconds East, 6,598.53 feet;

6 thence South 37 degrees 22 minutes 02 seconds East, 6,610.08 feet;

7 thence South 00 degrees 35 minutes 23 seconds East, 7,555.17 feet;

8 thence South 30 degrees 26 minutes 05 seconds West, 1,143.95 feet;

9 thence South 03 degrees 55 minutes 22 seconds East, 3,724.62 feet;

10 thence South 17 degrees 58 minutes 34 seconds East, 3,169.01 feet;

11 thence South 79 degrees 39 minutes 56 seconds East, 1,303.27 feet;

12 thence South 43 degrees 47 minutes 11 seconds East, 1,683.12 feet;

13 thence South 04 degrees 49 minutes 19 seconds West, 1,849.85 feet;

14 thence South 00 degrees 35 minutes 14 seconds East, 3,080.53 feet;

15 thence North 74 degrees 35 minutes 02 seconds East, 1,332.75 feet;

16 thence South 01 degrees 13 minutes 18 seconds East, 1,873.85 feet;

17 thence North 88 degrees 43 minutes 12 seconds East, 2,191.97 feet to the terminus of said centerline at  
18 **Valencia Substation**, at grid coordinate (X) 1007459.01, (Y) 133493.23, of said Central Zone, and to which  
19 National Geodetic Survey point M423 (PID - CG0883) bears South 23 degrees 09 minutes 01 seconds  
20 East, 34,502.53 feet.

21 Said centerline is 57.785 miles in length, more or less.

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**BEFORE THE ARIZONA POWER PLANT AND  
TRANSMISSION LINE SITING COMMITTEE**

IN THE MATTER OF THE APPLICATION OF UNS  
ELECTRIC, INC. FOR A CERTIFICATE OF  
ENVIRONMENTAL COMPATIBILITY FOR THE VAIL  
TO VALENCIA 115 KV TO 138 KV TRANSMISSION  
LINE UPGRADE PROJECT, ORIGINATING AT THE  
EXISTING VAIL SUBSTATION IN SEC. 4, T.16S.,  
R.15E., PIMA COUNTY, TO THE EXISTING  
VALENCIA SUBSTATION IN SEC. 5, T.24S.,  
R.14E., IN THE CITY OF NOGALES, SANTA CRUZ  
COUNTY, ARIZONA.

Docket No. L-00000F-09-0190-00144

Case No. 144

**CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY**

Pursuant to notice given as provided by law, the Arizona Power Plant and Transmission  
Line Siting Committee (the "Committee") held public hearings on June 23, 4, 2009 in Rio Rico,  
all in conformance with the requirements of Arizona Revised Statutes ("A.R.S.") § 40-360, et  
seq., for the purpose of receiving evidence and deliberating on the application of UNS Electric,  
Inc. ("Applicant"), incorporated herein, for a Certificate of Environmental Compatibility ("CEC") in  
the above-captioned case (the "Project").

The following members and designees of members of the Committee were present at  
one or more of the hearings for the evidentiary presentations and/or for the deliberations:

John Foreman	Chairman, Designee for Arizona Attorney General Terry Goddard
David L. Eberhart, P.E.	Designee for Chairman, Arizona Corporation Commission
Paul Rasmussen	Designee for Director, Arizona Department of Environmental Quality
Jessica Youle	Designee for Director, Energy Department, Arizona Department of Commerce
Jeff Maguire	Appointed Member
Bill Mundell	Appointed Member
Patricia Noland	Appointed Member
Michael Palmer	Appointed Member
Michael Whalen	Appointed Member
Barry Wong	Appointed Member

The Applicant was represented by J. Matthew Derstine and Jason D. Gellman of Roshka,  
DeWulf & Patten, PLC, and Marcus G. Jerden of UniSource Energy Corporation.

The following parties were granted intervention pursuant to A.R.S. § 40-360.05: Marshall  
Magruder and Elizabeth Webb, both in pro persona.

At the conclusion of the hearings, the Committee, having received the Application, the appearances of the parties, the evidence, testimony and exhibits presented at the hearings, and being advised of the legal requirements of A.R.S. §§ 40-360 to 40-360.13, upon motion duly made and seconded, voted X to X to grant the Applicant this CEC (Case No. 144) for the Project to rebuild the existing 115 kV transmission line as a 138 kV transmission line and interconnect that transmission line to the Vail Substation as set forth in the Application.

The Project as approved consists of approximately 57.8 miles of 138 kV transmission line and ancillary facilities along the route as described below. The Project starts at the Vail Substation, and ends at the Valencia Substation. A legal description and general location map of the Project is attached as Exhibit A.

As explained in the Project Application, the Project will:

- Interconnect the northern end of the line with the Vail 345/138 kV Substation instead of the Nogales Tap.
- Upgrade the line voltage from 115 kV to 138 kV.
- Replace wooden H-frame structures with steel monopoles.

As explained in the Project Application, the Project Alignment (the route granted for the Project in this CEC), consisting of a 500-foot-wide planning corridor except where noted, and as further described in attached Exhibit A and the Application is as follows: The Project Alignment originates from the Vail Substation in Section 4, Township 16 South, Range 15 East. The Project Alignment then extends westerly parallel to TEP's Vail-Robert Bills (138 kV) and Vail-Irvington (138 kV) lines along an access road which is an east extension of the Old Vail Connection Road to where Old Vail Connection Road intersects Wilmet Road (2.3 miles). At this intersection, the Alignment turns south extending to the Nogales Tap and interconnects to the existing line (1.5 miles). From that interconnection, the alignment then continues south to the Kantor Substation (27.8 miles) utilizing the existing line that was previously rebuilt in accordance in the Application in Line Siting Case No. 78 and approved in Decision No. 56097 (July 6, 1988). No improvements, pole replacements, or construction are necessary therein and the existing line in this portion is hereby designated for operation at 138 kV.

The Project Alignment leaves the Kantor Substation southerly along the foothills of the Santa Rita Mountains east to the Santa Cruz River. South of Josephine Canyon, the Project Alignment drops out of the foothills and into the Santa Cruz River Valley (11.8 miles). To this point from the Nogales Tap the Project Alignment follows the alignment for the existing 115 kV transmission line. North of the intersection of that existing 115 kV transmission line alignment and Pendleton Drive, the Project Alignment deviates from the existing 115 kV transmission line alignment and shifts 0.2 miles to the easterly edge of the UPRR right-of-way.

The Project Alignment then continues paralleling the UPRR right-of-way to the Cañez Substation (1.6 miles), and then continuing southerly adjacent to the UPRR in the Santa Cruz River Valley (3.4 miles). Near the intersection of Pendleton Drive and Avenida Coatimundi, the alignment shifts from the UPRR right-of-way and parallels Avenida Coatimundi east to the Sonoita Substation (0.3 miles).

The Project Alignment extends southerly out of the Sonoita Substation along the existing line across Sonoita Creek and the Santa Cruz River to Old Tucson Road, and then parallels Old Tucson Road to a point near the intersection with Grand Avenue (5.9 miles).

At the intersection of Old Tucson Road and Grand Avenue, the line departs from the existing line to proceed east of and parallel to Grand Avenue on the east side of Nogales Wash through an industrial area (0.9 miles). The Project Alignment then returns to the existing line alignment near where Frank Reed Road intersects Grand Avenue, and continues south, along the west side of the Santa Cruz County Complex (0.8 miles). The Alignment then shifts east and passes through the Preston Mobile Home Park (0.3 miles) with a 1250-foot-wide planning corridor for this course only.

The Project Alignment then turns to the south through the Mariposa Mall, across Mariposa Road, and through the Loma Linda Shopping Center (0.4 miles). The Project

Alignment continues on the existing line's alignment and turns to the east, entering the Valencia Substation located in Section 5, Township 24 South, Range 13 East (0.4 miles).

The Project will replace the existing wooden H-frame structures with steel monopoles as described in the Application. Steel monopoles will also be used between Vail Substation and the Nogales Tap; the existing transmission line portion constructed pursuant to Line Siting Case No. 78 is already on steel monopoles.

### CONDITIONS

This Certificate is granted upon the following conditions:

1. The Applicant shall obtain all approvals and permits required by the United States, the State of Arizona, Pima County, Santa Cruz County, the City of Tucson, the City of Nogales, the City of Sahuarita, US Bureau of Land Management ("BLM") and any other governmental entities having jurisdiction necessary to construct the Project.
2. The Applicant shall comply with all existing applicable statutes, ordinances, county comprehensive plans, city/town general plans, master plans, project area development and subdivision plans, and regulations of the United States, the State of Arizona, Pima County, Santa Cruz County, the City of Tucson, the City of Nogales, the City of Sahuarita and any other governmental entities having jurisdiction during the construction and operation of the transmission line.
- 2A. Applicant shall construct the Project transmission lines only within the corridor more fully described in Exhibit A, attached hereto. [Case No. 111, Condition 3, ACC Decision 64356]
3. If any archaeological, paleontological or historical site or object that is at least fifty years old is discovered on federal, state, county or municipal land during the construction or operation of the transmission line, the Applicant or its representative in charge shall promptly report the discovery to the Director of the Arizona State Museum, and in consultation with the Director, shall immediately take all reasonable steps to secure and maintain the preservation of the discovery as required under A.R.S. § 41-844.
4. If human remains and/or funerary objects are encountered on private land during the course of any ground disturbing activities relating to the construction or operation of the transmission line, the Applicant shall cease work on the affected area of the Project and notify the Director of the Arizona State Museum as required under A.R.S. § 41-865.
5. The Applicant shall comply with the notice and salvage requirements of the Arizona Native Plant Law (A.R.S. §§ 3-901 et seq. as applicable), County and municipal plant ordinances, and shall, to the extent feasible, minimize the destruction of native plants during the construction and operation of the transmission line.
6. The Applicant shall not assign this Certificate or its interest in the Project authorized by this Certificate unless both Applicant (as Transferor/Assignor) and Transferee/Assigned has signed a "Notice of Transfer of Certificate of Environmental Compatibility" ("Notice") as required under A.R.S. § 40-360.08(A) and A.A.C. R14-3-213(F). That Notice must be filed in this Docket. Transferee/Assignee, as part of acquiring any interest in the Project, must agree to comply with all terms, limitations and conditions contained within this Certificate originally issued to Applicant by the Arizona Power Plant and Transmission Line Siting Committee and approved and/or issued by the Arizona Corporation Commission.
- 6A. Where appearing below, "Applicant" includes any assignees.
7. This authorization to construct this Project shall expire five years from the date the Certificate is approved by the Commission unless the transmission line is capable of operation. However, prior to expiration, the Applicant will have the right to apply to the Commission for an extension of this time limitation up to six months prior to expiration. [Case No. 111, Condition 17 modified, ACC Decision 64356]
8. In the event that the Project requires an extension of the term of this Certificate prior to

- completion of construction, Applicant shall use reasonable means to notify, including by first class mail, all landowners, neighborhood associations registered with the local governing jurisdiction, and residents within one mile of the Project corridor, all persons who made public comment at this proceeding, and all parties to this proceeding of the request, the date, time and place of the hearing in which the Commission will consider its request for extension. [CONDITION 7 IN CASE 137 DECISION NO. 70489]
9. The Applicant shall make every reasonable effort to identify and correct, on a case specific basis, all complaints of interference with radio or television signals from operation of the transmission lines and related facilities addressed in this Certificate. The Applicant shall maintain written records for a period of five years of all complaints of radio or television interference attributable to operation, together with the corrective action taken in response to each complaint. All complaints shall be recorded to include notations on the corrective action taken. Complaints not leading to a specific action or for which there was no resolution shall be noted and explained. A copy of these records will be provided to the ACC Staff, upon request.
10. Within 120 days of the Commission decision granting this Certificate, Applicant will post signs, at least 3-feet by 3-feet in size, in public rights-of-way giving notice of the Project corridor to the extent authorized by law. The Applicant shall place signs in prominent locations at reasonable intervals such that the public is notified along the full length of the transmission line until the transmission structures are constructed. To the extent practicable, within 45 days of securing easement or right-of-way for the Project, the Applicant shall erect and maintain signs providing public notice that the property is the site of a future transmission line. The signs shall advise:
- (a) That the site has been approved for the construction of Project facilities;
  - (b) The expected date of completion of the Project facilities;
  - (c) A phone number for public information regarding the Project;
  - (d) The name of the Project;
  - (e) The name of the Applicant; and
  - (f) The website of the Project.
11. Applicant shall design the transmission lines to incorporate reasonable measures to minimize impacts to raptors.
12. Applicant shall use non-specular conductors and with
- 12A. A dulled surface color suitable for the terrain and vegetation [excerpt from Case No. 111, Condition No. 11(a)] will be used for transmission line structures with a goal that the visual contrast between the pole finish and background be minimized. After approval of the final alignment by the Committee, the applicant shall submit a Pole Plan within 30 days the proposed pole finish for each part of each segment to the parties. The criteria used shall be that poles in the open terrain shall have a dulled galvanized steel finish and when looking from where the greatest population would see these poles with a sky background. In areas where poles are sited where the greatest population having a terrain background behind the pole such as in a valley away from a road, then self-weathering finish will be satisfactory.
- 12B. Applicant shall retain an archaeologist satisfactory to the State Historical Preservation Office (SHPO). The archaeologist shall be on site during construction activities where new routes are being developed to advise Applicant in connection with additional archeological and preservation efforts for archaeological sites that may be required and to manage cultural and historical preservation efforts for archeological sites that may be affected by the construction of new transmission lines. The archeologist shall meet and confer with representatives of local American Nations and historical societies to determine any sensitive areas and if and how they can be avoided or mitigated. [Case No. 111, Condition 8, Decision 64356]
- 12C. Applicants shall retain a biologist satisfactory to the Arizona Game and Fish Department.

The biologist is to be on-site during construction activities in connecting with any additional biological and related studies that may be required and to advise Applicant in connection with mitigation efforts for any endangered, threatened and sensitive species that maybe affected by the construction of the project transmission lines. [Case No. 111, Condition 9, Decision 65356]

13. Before construction on this Project may commence, the Applicant shall file a construction Mitigation and Restoration Plan with ACC Docket Control and copies to all parties. Where practicable, the Plan shall specify the Applicant's plans for construction access and methods to minimize impacts to wildlife and to minimize vegetation disturbance outside of the Project right-of-way particularly in drainage channels and along stream banks, and shall re-vegetate, unless waived by the landowner, native areas of construction disturbance to its preconstruction state outside of the power-line right of way after construction has been completed. The Plan shall specify the Applicant's plans for coordination with the Arizona Game and Fish Department and the State Historic Preservation Office. The Applicant shall use existing roads for construction and access where practicable and the Plan shall specify the manner in which the Applicant makes use of existing roads.
14. With respect to the Project, Applicant shall participate in good faith in state and regional transmission study forums to coordinate transmission expansion plans related to the Project and to resolve transmission constraints in a timely manner.
15. The Applicant shall provide copies of this Certificate to the City of Tucson, the City of Sahuarita, the City of Nogales, Pima County, Santa Cruz County, the Arizona State Land Department, the State Historic Preservation Office, and the Arizona Game and Fish Department.
16. Prior to the date construction commences on this Project, the Applicant shall provide known homeowners and businesses, realtors, homebuilders, neighborhood associations registered with the local jurisdictions, and developers of record, within one mile of the center line of the Certificated Project Alignment the identity, location, and a pictorial depiction of the type of power line being constructed, accompanied by a written description, and encourage the developers and homebuilders to include this information in the developers and homebuilders' homeowners' disclosure statements. [SEE CONDITION 6 IN CASE 137 DECISION NO. 70649].
- 16A. Applicant shall within one year of completion of the Project, rehabilitate to its original state any and all areas disturbed by construction of the Project, except for any road that maybe necessary to access the transmission lines for maintenance and repair. The goals of the Mitigation and Restoration Plan will be to avoid impacts where practicable; and where impacts are unavoidable, minimize impacts; and focus on site preparation to facilitate natural processes to revegetation. Other key elements of this Plan are to
  - Emphasize final site preparation to encourage natural revegetation;
  - Prohibit use of any non-native plants or seeds during revegetation;
  - Avoid (i.e., reserve) where practical, mature native trees;
  - Preserve topsoil and plant materials from the right-of-way before grading, and re-spread over the right-of-way after construction is complete;
  - Imprint the restored right-of-way to provide indentations to catch seed and water;
  - Implement best management practices to protect the soil;
  - Apply restoration methods that have been shown to work in the desert environment;
  - Prevent the spread of noxious weeds or other undesirable species; and
  - Apply methods to discourage unauthorized off-highway-vehicle (OHV) use of the right-of-way for all segments. [Case No. 111, Condition 13, ACC Decision 64356]
17. Before commencing construction of Project facilities located parallel to and within 100 feet of any existing natural gas or hazardous liquid pipeline, the Applicant shall:
  - (a) Perform the appropriate grounding and cathodic protection studies to show that the

- 1 Project's location parallel to and within 100 feet of such pipeline results in no material  
2 adverse impacts to the pipeline or to public safety when both the pipeline and the  
3 Project are in operation. If material adverse impacts are noted in the studies, Applicant  
4 shall take appropriate steps to ensure that such material adverse impacts are mitigated.  
5 Applicant shall provide a copy of all such studies to Commission Staff ; and  
6 (b) Perform a technical study simulating an outage of the Project that may be caused by  
7 the collocation of the Project parallel to and within 100 feet of the existing natural gas or  
8 hazardous liquid pipeline. This study should either: i) show that such outage does not  
9 result in customer outages; or ii) include operating plans to minimize any resulting  
10 customer outages. Applicant shall provide a copy of this study to Commission Staff.  
11 18. Applicant will comply the latest Western Electricity Coordinating Council North American  
12 Electric Reliability Corporation Planning standards as approved by the Federal Energy  
13 Regulatory Commission, and National Electrical Safety Code construction standards.  
14 19. The Applicant shall submit a self-certification letter annually, identifying progress made with  
15 respect to each condition contained in the Certificate, including which conditions have been  
16 met. Each letter shall be submitted to the Docket Control of the Arizona Corporation  
17 Commission and the parties on August 1 beginning in 2011. Attached to each certification  
18 letter shall be documentation explaining how compliance with each condition was achieved.  
19 Copies of each letter along with the corresponding documentation shall be submitted to the  
20 Arizona Attorney General and Department of Commerce Energy Office. The requirement  
21 for the self-certification shall expire on the date the Project is placed into operation.  
22 20. Within sixty (60) days of the Commission decision granting this Certificate, the Applicant  
23 shall make good faith efforts to commence discussions with private landowners, on  
24 whose property the Project Alignment is located, to identify the specific location for the  
25 Project's right-of-way and placement of poles.  
26 21. The Applicant shall expeditiously pursue reasonable efforts to work with private  
27 landowners on whose property the Project right-of-way will be located, to mitigate the  
28 impacts of the location, construction, and operation of the Project on private land.  
29 22. This Certificate recognizes that, as part of this Project, the existing line in Segment 1B will  
30 now operate at 138 kV.

#### FINDINGS OF FACT AND CONCLUSIONS OF LAW

This Certificate incorporates the following findings of fact and conclusions of law:

1. The Project is in the public interest because it aids the state in meeting the need for an adequate, economical and reliable supply of electric power.
2. In balancing the need for the Project with its effect on the environment and ecology of the state, the conditions placed on the CEC by the Committee effectively minimize its impact on the environment and ecology of the state.
3. The conditions placed on the CEC by the Committee resolve matters concerning the need for the Project and its impact on the environment and ecology of the state raised during the course of proceedings, and as such, serves as the findings on the matters raised.
4. In light of these conditions, the balancing in the broad public interest results in favor of granting the CEC.

DATED this \_\_\_\_ day of \_\_\_\_\_ 2009.

**THE ARIZONA POWER PLANT AND  
TRANSMISSION LINE SITING COMMITTEE**



Hon. John Foreman, Chairman

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MAGRUDER DRAFT (condensed, no redlines)

## Exhibit A

A transmission line corridor, with the centerline, as determined from Arizona State Plane Coordinate mapping, more particularly described as follows:

Beginning at **Vail Substation**, at grid coordinate (X) 1041085.39, (Y) 391274.36, of Central Zone of Arizona State Plane Coordinate System 1983, and to which National Geodetic Survey point PUMP (PID - 20262) bears South 42 degrees 20 minutes 38 seconds West, 4,870.50 feet;  
thence North 88 degrees 44 minutes 54 seconds West, 307.61 feet;  
thence North 60 degrees 17 minutes 58 seconds West, 1,037.36 feet;  
thence North 00 degrees 07 minutes 58 seconds West, 1,017.67 feet;  
thence South 89 degrees 32 minutes 32 seconds West, 11,891.07 feet;  
thence South 05 degrees 40 minutes 55 seconds West, 1,744.96 feet;  
thence South 00 degrees 34 minutes 52 seconds East, 6,224.41 feet to a point in **Nogales Tap Substation**;  
thence South 00 degrees 34 minutes 52 seconds East, 50,753.00 feet;  
thence South 34 degrees 21 minutes 34 seconds West, 95,891.68 feet;  
thence South 88 degrees 34 minutes 55 seconds West, 121.34 feet to a point in **Kantor Substation**;  
thence South 03 degrees 13 minutes 57 seconds East, 158.25 feet;  
thence South 21 degrees 14 minutes 55 seconds East, 22,453.78 feet;  
thence South 00 degrees 29 minutes 36 seconds East, 9,041.69 feet;  
thence South 19 degrees 02 minutes 10 seconds West, 1,795.09 feet;  
thence South 00 degrees 29 minutes 28 seconds East, 2,408.16 feet;  
thence South 12 degrees 35 minutes 44 seconds East, 2,722.98 feet;  
thence South 00 degrees 28 minutes 50 seconds East, 13,826.04 feet;  
thence South 56 degrees 02 minutes 44 seconds West, 1,101.12 feet to the beginning of a non-tangent curve concave to the southwest, having a radius of 5,853.84 feet, and to which a radial line bears North 47 degrees 55 minutes 45 seconds East;  
thence southeasterly 2,370.68 feet along said curve through a central angle of 23 degrees 12 minutes 13 seconds;  
thence South 18 degrees 52 minutes 02 seconds East, 5,858.00 feet to a point 172 feet westerly of the west side of **Cañez Substation**;  
thence South 18 degrees 52 minutes 02 seconds East, 12,393.42 feet to the beginning of a curve concave to the northeast and having a radius of 5,553.78 feet;  
thence southeasterly 3,924.97 feet through a central angle of 41 degrees 00 minutes 28 seconds;  
thence South 59 degrees 52 minutes 30 seconds East, 1,369.94 feet;  
thence North 64 degrees 22 minutes 52 seconds East, 1,337.41 feet to a point 63 feet southerly of the south side of **Gonzoia Substation**;  
thence South 23 degrees 54 minutes 45 seconds East, 2,434.49 feet;  
thence South 49 degrees 53 minutes 51 seconds East, 6,598.53 feet;  
thence South 87 degrees 22 minutes 02 seconds East, 6,610.08 feet;  
thence South 00 degrees 35 minutes 23 seconds East, 7,555.17 feet;  
thence South 30 degrees 26 minutes 05 seconds West, 1,143.95 feet;  
thence South 03 degrees 55 minutes 22 seconds East, 3,724.62 feet;  
thence South 17 degrees 58 minutes 34 seconds East, 3,169.01 feet;  
thence South 79 degrees 39 minutes 56 seconds East, 1,303.27 feet;  
thence South 43 degrees 47 minutes 11 seconds East, 1,683.12 feet;  
thence South 04 degrees 49 minutes 19 seconds West, 1,849.85 feet;  
thence South 00 degrees 35 minutes 14 seconds East, 3,980.53 feet;  
thence North 74 degrees 35 minutes 02 seconds East, 1,332.75 feet;  
thence South 01 degrees 13 minutes 18 seconds East, 1,873.85 feet;  
thence North 88 degrees 43 minutes 12 seconds East, 2,191.97 feet to the terminus of said centerline at **Valencia Substation**, at grid coordinate (X) 1007459.01, (Y) 133493.23, of said Central Zone, and to which National Geodetic Survey point M423 (PID - CG0883) bears South 23 degrees 09 minutes 01 seconds East, 34,502.53 feet.  
Said centerline is 57.785 miles in length, more or less.

**From:** "Marshall Magruder" <mmagruder@earthlink.net>  
**To:** "Mary Ippolito" <mippolito@rdp-law.com>, "E Webb" <vailaz@hotmail.com>, ...  
**Date:** 5/30/2009 12:57 AM  
**Subject:** Case 144, Magruder pre-filed Exhibits  
**Attachments:** Exhibit MM-1 DR MM 1-1.pdf; Exhibit MM-3 Aussie Widget Measures Wood Pole Strength.doc; Exhibit MM-5 Table F-1.doc; Exhibit MM-6 2008-2028 Forecast.doc; Exhibit MM-7-Santa Cruz Generation 2008-28.doc; Exhibit MM-8 DR 1-3 Response.tiff; Exhibit MM-9 SWTC Substation ID Info.doc; Exhibit MM-10 Magruder Witness Summary and Exhibits.doc

I was unable to make the 2 PM State shuttle to Phoenix due to time (3 hours) required to reproduce this filing. It will be on Monday's shuttle to Phoenix. Copies were mailed at the main post office about 5 PM to all parties.

I have prepared one copy of this entire filing in a 3-ring folder marked for each Committee member and one copy for the Applicant and its attorney and Ms. Webb. On Monday, I will leave at the hotel in the <sup>3</sup>mail<sup>2</sup> the folders for any Committee members with reservations for Monday night.

Attached are the following Magruder pre-filed Exhibits:

Exhibit MM-1, MM-3, MM-5, MM-6, MM-7, MM-8, MM-9, and MM-10

Two exhibits are not attached electronically:

Exhibit MM-2, a PDF excerpt from a UNS Electric filing of 9 Feb 2004, provided on 26 May 2009 to UNS Electric, also available on ACC website  
Exhibit MM-4, an excerpt from a Magruder filing of 8 July 2005 with UNS Electric, provided to UNS Electric on 26 May 2009.

Early on Monday, 1 June 2009, I will electronically provide a copy of the Magruder pre-filed Testimony to all parties, file 25 hard copies with ACC Docket Control by mail, and provide one copy in each 3-ring folder discussed above.

For Committee members who are not at the hotel or who did not pickup their mail, I will have their individual folders available early Tuesday, 2 June 2009.

Sincerely,

Marshall Magruder  
PO Box 1267  
Tubac, AZ 85646  
marshall@magruder.org  
520.398.8587

On 5/29/09 12:01 PM, "Marshall Magruder" <mmagruder@earthlink.net> wrote:

- > In a few hours, before 2 PM to catch the State shuttle to Phoenix, I will file
- > the following:
- >
- > (1) DRAFT CEC (clean, condensed, and redlined)
- > (2) Magruder Witness Summary with 10 exhibits.
- >
- > Attached to this email are (1) and (2). Exhibits in separate email(s)

- >
- > If there are any problems please let me know.
- >
- > Marshall Magruder
- > PO Box 1267
- > Tubac, AZ 85646
- > marshall@magruder.org
- > 520.398.8587



EXHIBIT  
MM - 8

Emailed Only (trtf@wapa.gov)

April 3, 2009

Transmission Infrastructure Program  
Western Area Power Administration  
P.O. Box 281213  
Lakewood, Colorado 80228-8213

Re: Statement of Interest - Arizona System Enhancements

To Whom It May Concern:

Pursuant to Federal Register Vol. 74, No. 41, March 4, 2009, Western Area Power Administration ("Western") Notice of Availability of Request for Interest, Arizona Public Service Company, the Salt River Project Agricultural Improvement and Power District, Southwest Transmission Cooperative, Tucson Electric Power Company and UNS Electric, Inc. (collectively referred to as "The Parties") provide this statement of interest identifying transmission system enhancements in Arizona to facilitate the delivery of renewable resources. The series of projects contained in this proposal are entirely within Western's service territory, include new facilities and/or upgrades to Western's system and other utilities' systems, and will facilitate the delivery of solar and wind resources from multiple proposed projects to multiple utilities.

The projects supported by The Parties, contained within this proposal, provide for increased transmission capacity thereby improving the feasibility of renewable generation projects. These proposed transmission projects will support in excess of 13,500 MW of renewable wind and solar generation additions as listed on interconnection queues. The Parties' proposed system upgrades will increase system reliability for all participants' customers. Many of the proposed projects are "shovel ready" and can therefore be used to promote the objective(s) of the American Recovery and Reinvestment Act of 2009.

The Parties have enclosed detailed information on each of the proposed transmission projects. Should you have any questions or require additional information, the entity's contact information for each proposed transmission project is listed within the specific project proposal.

- Transmittal 2009-04-03.pdf
- APS Western RFI.pdf
  - APS Credit Application for Submittal with RFI Res...
  - SRP RFI Response - Final for Multi-Party Submitt...
  - SRP Credit Application for Submittal with RFI Res...
  - SOI for a TEP and SWTC Renewable Energy Trans...
  - TEP Credit Application for submittal with RFI res...
  - SOI for a UNS Electric Renewable Energy Transm...
  - UNSE Credit Application for submittal with RFI re...



**UNS ELECTRIC (SANTA CRUZ) SYSTEM**

**CONVERSION FROM POINT-TO-POINT SERVICE TO NETWORK  
INTEGRATION TRANSMISSION SERVICE**

**PREPARED FOR THE WESTERN AREA POWER  
ADMINISTRATION**

TEP  
Bobby Chavez  
Transmission System Planning

May, 22 2008

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## EXECUTIVE SUMMARY

The Santa Cruz system is a Radial System supplied from the interconnected transmission system via a connection at the WAPA Nogales 115 kV station; and that, as such, it is inherently designed to accept load shedding for any single contingency outage that trips its radial feed from the WAPA Nogales station.

In accordance with this technical study, UNSE operations will develop a system operating procedure to operate Valencia turbines to regulate the import at NOGALES. As identified, a single Valencia Turbine will be operating as the NOGALES import approaches 51MW and additional Valencia Turbines will be operated as the NOGALES import approaches 65MW, pending the system addition of the PANTANO tie into Western's NOGALES to ADAMS 115kV circuit.

The UniSource Energy Services (UNSE) Santa Cruz 115kV System is currently served through a 65MW Point-to-Point service contract, metered at the Western Area Power Administration's Nogales switchyard. UNSE Santa Cruz is interested in converting this from Point-to-Point service to Network Integration Transmission Service (NITS).

With the planned December 2008 addition of the Southwest Transmission Cooperative (SWTC) PANTANO tie into the WAPA NOGALES to ADAMS 115kV circuit on the UNSE Santa Cruz system supplied from the 115kV WAPA NOGALES TAP will adequately serve load into the 2013 time frame and beyond.

The UNSE Santa Cruz Import Capability from the 115kV NOGALES TAP varies with the commitment and dispatch of the local Valencia combustion turbines.

UNSE is planning to add distribution capacitors to its system which will improve the power factor. In contemplation of this correction UNSE has run a study with these revised power factors.

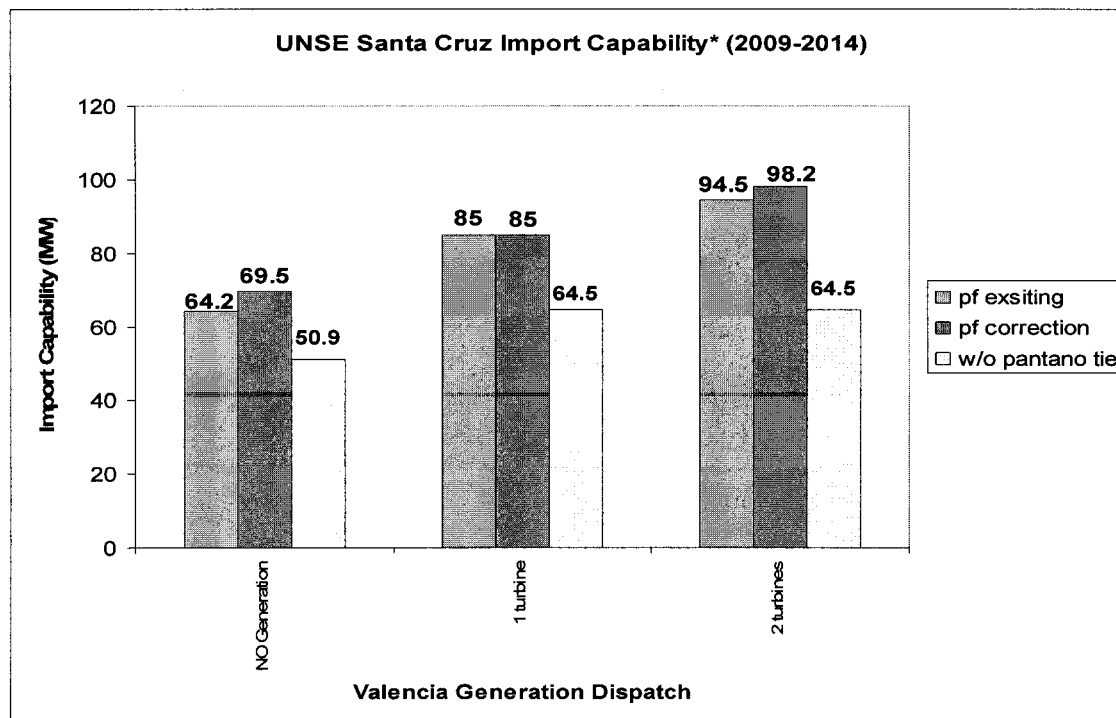




Figure 1: UNSE Santa Cruz Import Capability

\*UNSE Santa Cruz Import Capability Study assumes that SWTC ties into the WAPA 115kV circuit via PANTANO tie-in (December 2008) unless noted.

The chart above shows the import capability of the 115kV UNSE Santa Cruz system served as a radial from the NOGALES TAP. Before summer 2013 the UNSE Santa Cruz 115kV system will be rebuilt to a 138kV circuit and tied into the TEP Vail 138kV substation.

System Operating Limits for Santa Cruz system import capability and load-serving capability are N-0 (NERC Category A) conditions and N-1 (NERC Category B) conditions. Due to outages external to the UNSE Santa Cruz system operating limits are reached within the UNSE Santa Cruz system or on the external system depending on Valencia generation dispatch. As shown in table 1, the Import Capability and Load Serving capability are limited by Load Tap Changers at Valencia or Sonoita under normal conditions or by voltage deviations greater than 5% at the Valencia or Nogales 115kV substations due to outages on the WAPA 115kV system.

## IMPORT CAPABILITY

Sensitivities		Valencia Generation (MW)		Import Capability (MW)	UNSE Santa Cruz Load (MW)	Critical Element	Critical Outage	Stable with 5% margin
w/o Pantano Tie-In	pf correction	no generation	0	50.9	49	ΔV on Valencia 115kV	Del Bac - Nogales 115kV	solve
		1 Turbine	8.6	64.5	70	ΔV on Nogales 115kV	Del Bac - Nogales 115kV	solve
		2 Turbines	10.1	64.5	71.5	ΔV on Nogales 115kV	Del Bac - Nogales 115kV	solve
With Pantano Tie-In	pf correction	no generation	0.0	69.5	65.8	ΔV on Valencia 115kV	Nogales-Pantano 115kV	solve
		1 Turbine	12.2	85	92.0	ΔV on Valencia 115kV	Del Bac - Nogales 115kV	solve
		2 Turbines	18.0	98.2	109.0	ΔV on Nogales 115kV	Del Bac - Nogales 115kV	solve
	pf existing	no generation	0.0	64.2	61.0	Load Tap Changer on Valencia2		solve
		1 Turbine	12.2	85.0	92.0	ΔV on Valencia 115kV	Del Bac - Nogales 115kV	solve
		2 Turbines	17.5	95.1	106.0	Load Tap Changer on Sonoita1		solve

Table 1: Import Capability for various sensitivities.

A 5% load margin was added to all Import Capability models seen in Table 1 above. All models satisfy the WECC 5% MW load margin criteria.

## BACKGROUND

The existing UNSE Santa Cruz 115kV system is currently tied into the Western Area Power Administration (WAPA) 115kV line as seen in the Figure 1. By December 2008 Southwest Transmission Cooperative (SWTC) plans to loop in the existing WAPA NOGALES – ADAMS TAP 115kV circuit to the SWTC PANTANO Substation as shown in Figure 2.

This proposed interconnection by SWTC will provide an additional path for APACHE generation to flow and thus increase the reliability of the 115kV system in this area.

Figure 1: UNSE Santa Cruz 115kV system and surrounding systems

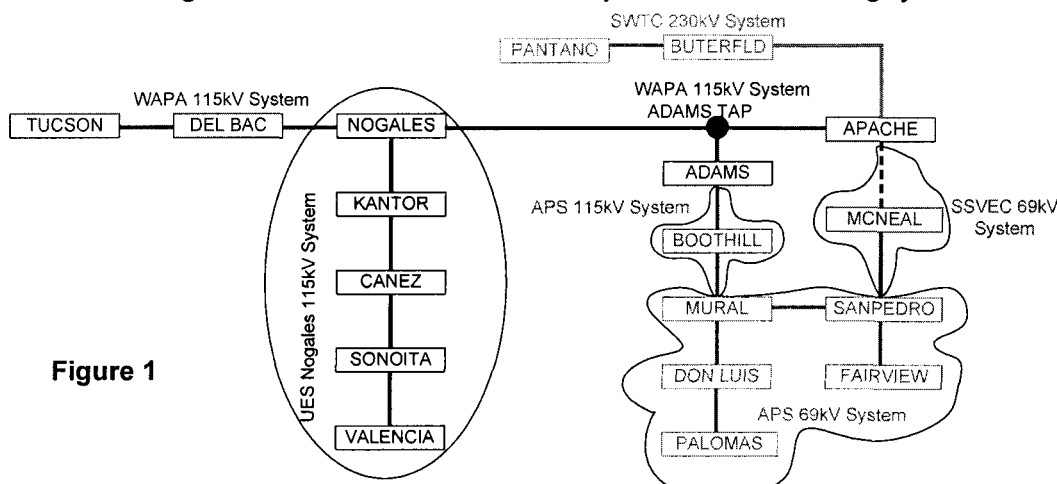


Figure 1

Figure 2: UNSE Santa Cruz and surrounding systems with Pantano 230/115kV loop-in

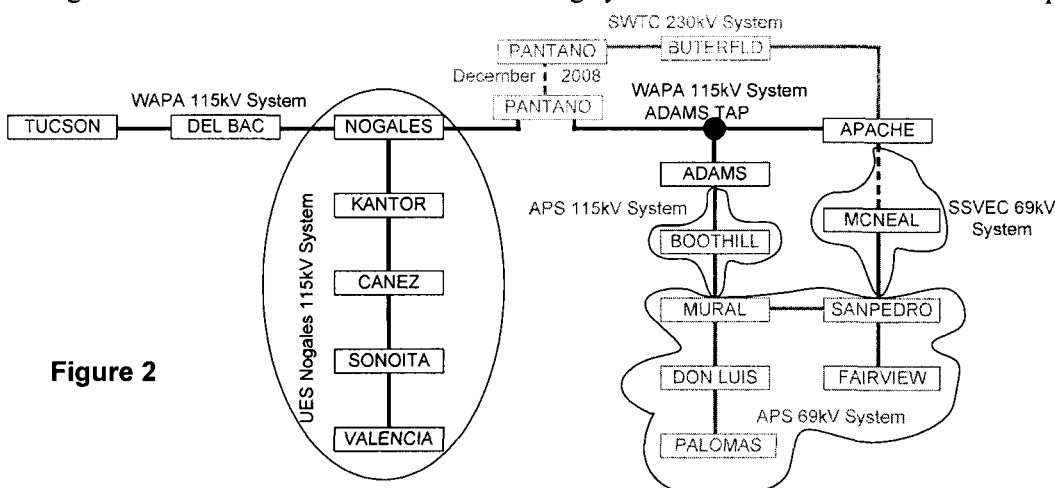


Figure 2

## SCOPE

Determine if Network Integration Transmission Service (NITS) will justify additional load serving capability for the UNSE Santa Cruz 115kV System.

## MODELING ASSUMPTIONS

### *Import Capability Limitations*

Import Capability will be limited by one of the following N-1 criteria violations:

- 1) Overload on any UNSE Santa Cruz 115/13.2kV load serving transformer
- 2) Overload on any UNSE Santa Cruz 115kV circuit
- 3) LTC (Load Tap Changer) voltage regulation below 1.0 p.u. on the 13.2kV side of any UNSE Santa Cruz 115/13.2kV load serving transformer with All Lines In Service (ALIS).

- 4) Delta V violations (5%+/-) on any UNSE Santa Cruz 115kV bus for N-1 outages
- 5) Meet all NERC/WECC criteria seen in the table 2 below:

**WECC DISTURBANCE-PERFORMANCE TABLE  
OF ALLOWABLE EFFECTS ON OTHER SYSTEMS**

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard (See Note 2)
A	Not Applicable	Nothing in addition to NERC		
B	$\geq 0.33$	Not to exceed 15% at load buses or 30% at non-load buses.  Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6 Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C	0.033 – 0.33	Not to exceed 30% at any bus.  Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0 Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D	$< 0.033$	Nothing in addition to NERC		

Table 2: NERC/WECC Criteria

### ***N-1 Outages under Consideration***

The following N-1 outages were analyzed after consultation with WAPA. These N-1 outages are the worst N-1 outages because they have the greatest affect on the UNSE Santa Cruz 115kV system with no loss in load.

- (1) TUCSON TO DEL BAC 115kV
- (2) DEL BAC TO NOGALES 115kV
- (3) NOGALES TO PANTANO 115kV
- (4) PANTANO TO ADAMS TAP TO APACHE 115kV
- (5) NOGALES TO ADAMS TAP TO APACHE 115kV

The following transient stability disturbances were evaluated:

- (1) Fault at TUCSON 115kV bus with clearing of the TUCSON TO DEL BAC 115kV circuit
- (2) Fault at DEL BAC 115kV bus with clearing of the TUCSON TO DEL BAC 115kV circuit
- (3) Fault at DEL BAC 115kV bus with clearing of the DEL BAC TO NOGALES 115kV circuit
- (4) Fault at NOGALES 115kV bus with clearing of the DEL BAC TO NOGALES 115kV circuit
- (5) Fault at NOGALES 115kV bus with clearing of the NOGALES TO PANTANO 115kV circuit
- (6) Fault at PANTANO 115kV bus with clearing of the NOGALES TO PANTANO 115kV circuit
- (7) Fault at PANTANO 115kV bus with clearing of the

- PANTANO TO ADAMS TO APACHE 115kV circuit
- (8) Fault at ADAMS 115kV bus with clearing of the  
PANTANO TO ADAMS\* TO APACHE 115kV circuit
  - (9) Fault at ADAMS 115kV bus with clearing of the  
NOGALES TO ADAMS\* TO APACHE 115kV circuit

Each transient stability simulation included a 3 phase fault cleared in 5 cycles.

\* the NOGALES TO ADAMS TO APACHE 115 kV circuit outage event is a line fault that trips two breakers in the NOGALES station (ring) and one breaker in the APACHE station (main-and-transfer) and, in so doing, trips the "unbreakered" line tap to the ADAMS load-serving system.

### **Category C Outage Assumptions**

The Santa Cruz system is a Radial System supplied from the interconnected transmission system via a connection at the WAPA Nogales 115 kV station; and that, as such, it is inherently designed to accept load shedding for any common mode contingency outage that trips the radial feed from the WAPA Nogales station.

### **Remote Generation to UNSE Santa Cruz 115kV system**

Generation dispatched per the 11hs1b WECC case (2011 Heavy Summer Load) which was approved by WECC on 01/12/2007. The 2011 HS1B base case represents a general case for study work reflecting realistic flows throughout WECC using generation economic dispatch.

### **Local Valencia Generation**

The Valencia gas turbines are rated as shown in Table 1 below:

Turbine	Minimum Power Output	Maximum Power Output	Minimum Reactive Output	Maximum Reactive Output
Valencia turbine #1	5 MW	13.8 MW	-5.5 MVAR	9.8 MVAR
Valencia turbine #2	5 MW	13.8 MW	-5.5 MVAR	9.8 MVAR
Valencia turbine #3	5 MW	13.8 MW	-5.5 MVAR	9.8 MVAR
Valencia turbine #4	5 MW	20 MW	-25 MVAR	15 MVAR

Table 3: Valencia Gas Turbine Ratings

### **SWTC Pantano 230/115kV Tie-In**

SWTC plans to loop-in WAPA's Nogales – Adams 115kV circuit into the SWTC Pantano Substation in December 2008. Refer to Figure 2, above.

### **Load Forecasting**

Load forecasts have been applied to the UNSE Santa Cruz 115kV system and the Cochise County APS 115 and 69kV systems. These load forecasts are the same forecasts used as part of the Southeast Arizona Transmission System (SATS) Study.

Sensitivities were performed to evaluate the impact of load growth of the SWTC system. SWTC load was increased to the forecasted 2012 load. The UNSE system required additional power factor correction to prevent delta V violations. It is assumed that UNSE will perform power factor correction to mitigate issues due to neighboring load growth.

The UNSE Santa Cruz system load is to be distributed in the following manner based on historical data:

<u>Substation</u>	<u>Percentage of total</u>
Kantor	9%
Canez	9%
Sonoita	30%
Valencia	52%

Table 4: UNSE Load Allocation

The UNSE Santa Cruz system load forecast is shown below in, Tables 5 and 6.

bus name	kV	2008		2009		2010	
		MW	MVAR	MW	MVAR	MW	MVAR
"KANTOR"	13.2	7.05	0.1	7.3	0.1	7.54	0.11
"CANEZ"	13.2	7.05	-1.22	7.3	-1.27	7.54	-1.31
"SONOITA1"	13.2	8.61	-0.24	8.92	-0.25	9.22	-0.26
"SONOITA2"	13.2	14.88	-4.54	15.41	-4.71	15.92	-4.86
"VALNCIA1"	13.2	22.71	0.91	23.52	0.94	24.3	0.97
"VALNCIA2"	13.2	18.01	2.53	18.65	2.62	19.27	2.7
<b>Total</b>		<b>78.31</b>	<b>-2.46</b>	<b>81.1</b>	<b>-2.57</b>	<b>83.79</b>	<b>-2.65</b>

Table 5: 2008 – 2010 UNSE Load Forecast

bus name	kV	2011		2012		2013	
		MW	MVAR	MW	MVAR	MW	MVAR
"KANTOR"	13.2	7.79	0.11	8.02	0.11	8.26	0.12
"CANEZ"	13.2	7.79	-1.35	8.02	-1.39	8.26	-1.43
"SONOITA1"	13.2	9.52	-0.27	9.8	-0.28	10.1	-0.29
"SONOITA2"	13.2	16.44	-5.02	16.93	-5.17	17.44	-5.33
"VALNCIA1"	13.2	25.09	1	25.84	1.03	26.62	1.07
"VALNCIA2"	13.2	19.9	2.79	20.49	2.87	21.11	2.96
<b>Total</b>		<b>86.53</b>	<b>-2.74</b>	<b>89.1</b>	<b>-2.83</b>	<b>91.79</b>	<b>-2.9</b>

Table 6 2001-2013 UNSE Load Forecast

### ***Power Factor (UNSE Santa Cruz 115kV System)***

Table 7 shows the UNSE Santa Cruz system existing power factors which were based on metered 2007 peak data and the assumed power factor correction.

Load	Existing Power Factor	Power Factor Correction
Kantor	0.9999	0.9999
Canez	-0.9853	-0.9853
Sonoita 1	-0.9996	<b>-0.98</b>
Sonoita 2	-0.9564	-0.9564
Valencia 1	0.9992	0.9992
Valencia 2	0.9903	<b>1</b>

Table 7: UNSE Power Factor, pf correction ( $\Delta$ bold)

## **POWER FLOW SENSITIVITIES**

### ***(1) With Pantano 230/115kV tie-in (existing power factor results)***

NITS will adequately meet system load with associated local Valencia generation scenarios for the period 2008 through 2014.

### ***(2) With Pantano 230/115kV tie-in (power Factor Correction results)***

#### ***UNSE proposed actions***

UNSE is planning to add distribution capacitors to its system which will improve the power factor. In contemplation of this correction UNSE has run a study with these revised power factors.

NITS will adequately meet system load with associated local Valencia generation scenarios for the period 2008 through 2014 with the '*UNSE proposed actions*' described above.

If the power factor was corrected on the 13.2kV distribution side (Table 7) import capability increases for NO generation and the 2 turbine generator scenarios.

### ***(3) Without Pantano 230/115kV tie-in (power Factor Correction results)***

As a sensitivity the UNSE Santa Cruz load was served without the planned December 2008 addition of the Southwest Transmission Cooperative (SWTC) PANTANO loop in to the WAPA NOGALES to ADAMS TAP 115kV circuit.

## POWER FLOW RESULTS

Figure 1 and tables 8 and 9 below compare the results of the three sensitivities, outline above. Comparisons are based on import capability and required must run generation.

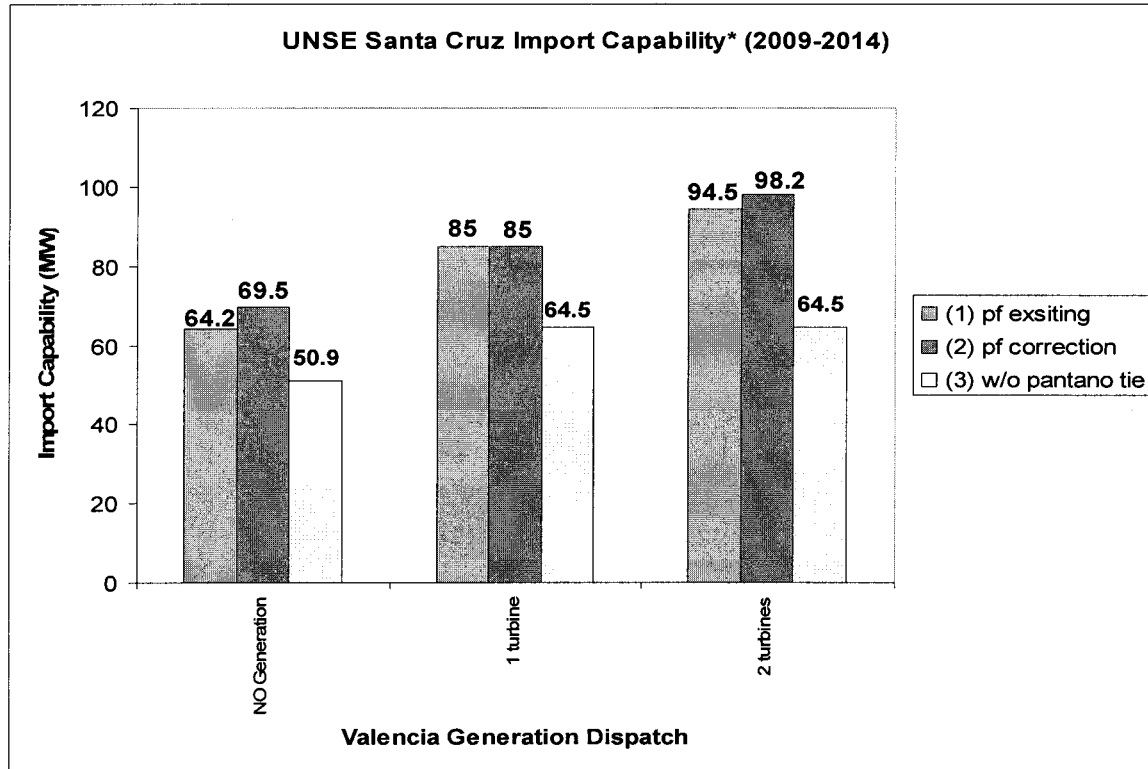


Figure 1: UNSE Santa Cruz Import Capability

\*UNSE Santa Cruz Import Capability Study assumes that SWTC ties into the WAPA 115kV circuit via PANTANO tie-in (December 2008) unless noted.

Year	Forecast Peak Load (MW)	with Pantano tie-in		w/o pantano tie-in
		Annual Local Generation Hours ( <u>NO</u> power factor correction)	Annual Local Generation Hours (power factor correction)	Annual Local Generation Hours (power factor correction)
2008	78	214	66	1170
2009	81	356	122	1453
2010	84	483	191	1716
2011	87	633	315	2031
2012	89	723	392	2269
2013	92	911	515	2652
2014	95	1102	654	3024

Table 8: Required Must-Run Generation

Sensitivities			Valencia Generation (MW)		Import Capability (MW)	UNSE Santa Cruz Load (MW)	Critical Element	Critical Outage	Stable with 5% margin
(1)	With Pantano Tie-In	pf correction	no generation	0.0	69.5	65.8	ΔV on Valencia 115kV	Nogales-Pantano 115kV	solve
			1 Turbine	12.2	85	92.0	ΔV on Valencia 115kV	Del Bac - Nogales 115kV	solve
			2 Turbines	18.0	98.2	109.0	ΔV on Nogales 115kV	Del Bac - Nogales 115kV	solve
(2)		pf existing	no generation	0.0	64.2	61.0	Load Tap Changer on Valencia2		solve
			1 Turbine	12.2	85.0	92.0	ΔV on Valencia 115kV	Del Bac - Nogales 115kV	solve
			2 Turbines	17.5	95.1	106.0	Load Tap Changer on Sonoita1		solve
(3)	w/o Pantano Tie-In	pf correction	no generation	0	50.9	49	ΔV on Valencia 115kV	Del Bac - Nogales 115kV	solve
			1 Turbine	8.6	64.5	70	ΔV on Nogales 115kV	Del Bac - Nogales 115kV	solve
			2 Turbines	10.1	64.5	71.5	ΔV on Nogales 115kV	Del Bac - Nogales 115kV	solve

Table 9: Import Capability for various sensitivities. This table outline sensitivities (1), (2) and (3)

Table 9 above outlines the Import Capability and the associated Critical Elements and Outages for the various Valencia generation scenarios and sensitivities. A 5% load margin was added to all Import Capability models seen in Table 9 above. All models satisfy the WECC 5% MW load margin criteria.

## TRANSIENT STABILITY RESULTS

All outages evaluated for the various Valencia generation scenarios meet criteria for voltage and frequency deviations. In addition, angular stability plots show the generators at Saguaro and Apache to be stable and damped, except Apache CT1 and CT4 for all N-1 outages.

Apache CT1 is not damped. The oscillations continued beyond the transient stability run time. Apache CT4 is showing loss of angular synchronization with respect to Apache CT2 and CT3.

As a sensitivity, the transient stability run time was extended to 60 seconds for the Del Bac to Nogales 115kV circuit outage. This outage causes the greatest 115kV voltage deviation on the UNSE Santa Cruz system. Approximately 15 seconds after the disturbance Apache CT4 levels off and demonstrates synchronization. Apache CT1 demonstrated damping with excessive oscillations.

As a sensitivity, the UNSE Santa Cruz system was removed from the power system model and the response of Apache CT1 and CT4 was monitored. Apache CT1 and CT4 demonstrated the same transient stability issues as seen for all the N-1 outages with UNSE Santa Cruz modeled. With the UNSE Santa Cruz system removed from the sensitivity case, the Apache CT1 and CT4 units continued to exhibit stability problems. Based on the results of this sensitivity, it can be concluded that the UNSE Santa Cruz system is not the cause of the Apache combustion turbine stability problems. The Apache CT angular stability plots for these sensitivities can be seen in APPENDICES G and H. Worst Condition Analysis (WCA) output and Stability plots can be found in APPENDICES A – F in which there are no violations.



## CONCLUSION

The Santa Cruz system is a Radial System supplied from the interconnected transmission system via a connection at the WAPA Nogales 115 kV station; and that, as such, it is inherently designed to accept load shedding for any single contingency outage that trips its radial feed from the WAPA Nogales station.

System Operating Limits for Santa Cruz system import capability and load-serving capability are N-0 (NERC Category A) conditions and N-1 (NERC Category B) conditions. Due to outages external to Santa Cruz system operating limits are reached within the Santa Cruz system or on the external system depending on Valencia generation dispatch.

The results of the power flow and transient stability simulations show that the UNSE Santa Cruz 115kV system can be served through a combination of transmission import capability and local generation. In fact with a correction to the power factor in Santa Cruz the import capability without local generation on-line increases. Due to the UNSE Santa Cruz system being unable to support the projected loads without additional shunt capacitors or operation of the Valencia generation, UNSE will develop an operating procedure based on the results of this system impact study. This operating procedure will be provided to WAPA. In accordance with this technical study, UNSE operations will develop a system operating procedure to operate Valencia turbines to regulate the import at NOGALES. As identified, a single Valencia Turbine will be operating as the NOGALES import approaches 51MW and additional Valencia Turbines will be operated as the NOGALES import approaches 65MW, pending the system addition of the PANTANO tie into Western's NOGALES to ADAMS 115kV circuit.

Therefore, conversion of the UNSE Santa Cruz load from Point-to-Point to Network Integration Transmission Service on the Parker-Davis System results in no system problems.

UNSE will develop an operating procedure for the Valencia turbines. This operating procedure is necessary due to the UNSE Santa Cruz system being unable to support projected loads without additional shunt distribution capacitors or operation of the Valencia turbines. This operating procedure will be based on the results of the system impact study and will be provided to WAPA.

## **Aussie Widget Measures Wood Pole Strength**

*TRANSMISSION & DISTRIBUTION WORLD*

Feb 1, 2009 12:00 PM

By H. Stewart Martin, Georgia Power

Accurate MPT field test enables Georgia Power to safely extend life of pole fleet.

T&D Poles are an Electric Utility's Greatest Single Infrastructure Investment. They represent one of the utility's biggest risks, as pole failure can seriously impact public safety and reliability. There has been no proven technique to provide an accepted empirical measure of the remaining strength of in-service poles — that is, until recently. After learning more about the benefits of mechanical pole testing (MPT), Georgia Power (Atlanta, Georgia, U.S.), a Southern Company, put this new type of inspection method to the test.

### **POLES AND INSPECTIONS**

The distribution poles at Georgia Power are primarily of the Southern Pine species and are subjected to very hot and moist weather conditions. The utility's older poles — mostly pressure-treated creosote — normally begin to deteriorate below ground at about 20 to 25 years into their service life.

Georgia Power has had a robust inspection and treatment program in place since the late 1980s. Prior to 1987, the utility primarily used the hammer-sounding test as the initial means of identifying suspect poles — there was no remedial treatment program in place. All of Georgia Power's purchased poles have been supplier treated with chromated copper arsenate (CCA) preservative since the late 1980s. To date, the utility has seen no deterioration of properly manufactured and treated CCA poles.

In addition to the decay damage done to Georgia Power's creosote poles prior to 1987, many attachments have been added to the poles for telecommunications, Internet and cable TV equipment. This all adds to the horizontal and vertical loading of the poles. The additional loading must be accounted for and compared to the pole strength for in-service poles.

It is imperative that unserviceable poles be removed from the system or properly reinforced. However, it is just as important not to remove serviceable poles prematurely. The cost of pole replacements vary from US\$400 to \$10,000, depending on the complexity of the attachments and the equipment on the pole.

In recent years, Georgia Power was finding that pole inspection vendors were becoming increasingly conservative in their evaluation of poles to reduce their risk and that of the utility. Georgia Power pole replacement crews expressed to management that they were being asked to replace more poles that appeared to be sound than in previous years.

### **MECHANICAL POLE TESTING**

Georgia Power's Distribution Design and Performance group, which handles the asset management guidelines for the distribution side of the business, recently decided to pilot and evaluate a new type of inspection method: the MPT 40. This process was developed by Deuar Pty Ltd. (Burpengary, Queensland, Australia). It was quite different than any of the traditional pole inspection methods used by most electric utilities in the United States.

Georgia Power began discussions with Dr. Kris Deuar in early 2006 to better understand the technology, safety issues and costs. The utility was initially concerned about the safety of these partial load tests, because it only would be testing weakened poles occasionally. It became convinced of the safety of the tests, as the weaker poles would be found with either a good visual and sounding inspection, or with only a minimal amount of force applied by the MPT device.

The MPT 40 approach made sense to Georgia Power. It gave a "direct" indication of the pole's strength, taking into account the differences inherent in the wood species used to produce the pole, the orientation of the defects and so forth. The theory is that by applying a known bending force, and then measuring very accurately how the pole geometry changes, the bending strength of the pole can be calculated. MPT had been used extensively in Australia, New Zealand and China with good reported success. Furthermore, the Forest Service Research Institute of New Zealand recommended it as the best method available for determining in-service pole strength.

The method uses digital protractors, attached to a pole, which measure the tilt (bending back) of the pole as the small pressure against the pole (always much less than the residual pole strength) is first applied and then released. Each pole is audio-visually inspected and subjected to a small initial load of 200 lb to 300 lb (91 kg to 136 kg) and then analyzed for safety before a final target load of 2000 lb to 3000 lb (907 kg to 1360 kg) is applied.

## THE PILOT TEST EXPERIENCE

In late summer 2006, Georgia Power had two conventional inspection vendors set to inspect and treat poles in Savannah, Georgia. Each vendor was to inspect and treat half of Savannah's pole plant. The utility contracted with Deuar to come to Savannah and perform tests on 100 of these poles. Two segments of the Savannah poles were selected to compare the MPT methodology for assessing serviceability with that of each conventional inspection contractor. In each vendor's assigned area, 50 poles were first tested by MPT, then later by one of the two conventional inspection vendors who did not know the result of the MPT evaluation.

In many cases, the two approaches (conventional versus MPT) were in close agreement and resulted in the same pass/fail determination ("fail" was given to poles that were less than two-thirds of their original nominal strength). However, in many cases, there was quite a bit of difference in the percentage-strength determinations.

Tables 1, 2 and 3 summarize the results of the pilot. It is significant to note that:

- \* Six poles that had been rejected by conventional inspections were rated by MPT as still serviceable.
- \* Four poles that had been found to be still serviceable by conventional means were rated by MPT as unserviceable.

Table 1. Reject Poles Life Extended with MPT 40 Tests

Pole tag number	MPT 40		Conventional tests		
	Remaining strength	Status	Remaining circumference	Remaining strength	Status
5452	68%	Pass	79%	50%	R2
5477	96%	Pass	77%	45%	R1
5481	67%	Pass	45%	9%	R3
5511	84%	Pass	67%	30%	R3
5521	71%	Pass	86%	63%	R1
5533	99%	Pass	63%	25%	R3

Table 2. Weak Poles Discovered (Risk Removed) with MPT 40 Tests (Not Rejects Previously)

Pole tag number	MPT 40		Conventional tests		
	Remaining strength	Status	Remaining circumference	Remaining strength	Status
5456	57%	Fail	100%	100%	OK
5515	65%	Fail	100%	100%	OK
5523	62%	Fail	100%	100%	OK
5524	66%	Fail	100%	100%	OK

Table 3. Poles Where MPT 40 Tests Agreed with Conventional Evaluation (Rejects Only)

Pole tag number	MPT 40		Conventional tests		
	Remaining strength	Status	Remaining circumference	Remaining strength	Status
5495	39%	Fail	45%	9%	R3
5498	66%	Fail	78%	48%	R1
5507	52%	Fail	33%	4%	R3
5519	8%	Fail	47%	10%	R3
5520	17%	Fail	29%	3%	R3
5531	57%	Fail	85%	61%	R1

However, the question remained: Was the MPT evaluation more accurate or just different?

## LABORATORY RESULTS

In an attempt to answer this question, Georgia Power joined an industry coalition in 2006 to perform pole tests with the National Electric Energy Testing, Research and Applications Center (NEETRAC). Several pole testing providers conducted independent analyses of the poles' remaining strength while they were still in-service. The poles were removed from service in 2007, and later break tested by NEETRAC in the lab.

Those tests proceeded slowly and were finally completed in the summer of 2007. The recently published report NEETRAC report showed the MPT process as one of the top-two predictors of pole strength. However, there were concerns about the useful application of the results. There was possible degradation of the poles over time and when they were removed and transported from the field location to Atlanta. Additionally, a great number of the poles failed at points well above the ground line, but every field vendor analysis addressed strength at ground line. Another series of tests is planned in 2009, where the test poles will be break tested in situ after the various vendors provide the predicted strength numbers to NEETRAC. Those involved believe that this will resolve the concerns of the previous tests.

## ANOTHER ROUND OF TESTS

In December 2006, Georgia Power asked Deuar to test 10 poles in Atlanta, nine of which recently had been rejected (found to have less than 67% remaining strength) during a conventional evaluation. The utility's plan was to have Deuar test all of those poles using the partial load, nondestructive methodology. After completing those tests, Deuar would then use the more robust MPT 20 to break test these poles in situ.

Because the final series of tests was destructive, Georgia Power took precautions to ensure the safety of personnel and property. The utility's worries were put to rest during the break tests, as none of the poles failed in a way that required support of the pole. None fell over. At failure, the poles

simply quit resisting the force of the MPT 20, the pressure dropped and the highest force was recorded to calculate the breaking strength.

The nondestructive round of tests, conducted with an MPT 40, calculated that eight of the nine poles previously rejected by the conventional evaluation were still serviceable and confirmed one as unserviceable. The MPT 40 test agreed with the conventional vendors on the one pole they found serviceable.

Georgia Power then had Deuar test the same 10 poles in situ, using an MPT 20, by applying force against them until they actually broke. These tests closely matched the MPT 40 findings, with eight poles still reflecting years of serviceable life and only one pole that had been found serviceable in the nondestructive test was found to be borderline reject in the destructive test (see the comparison of results in Table 4).

Table 4. Comparison of Results Nondestructive MPT, Destructive MPT and Conventional

Pole number	Conventional test		Mechanical pole tests				Observations and conclusions
	Evaluation	Status	Nondestructive		Destructive		
			Test	Status	Test	Status	
A-1	49%	R1	82%	Pass	127%	Pass	Both MPT tests show pole still serviceable.
A-2	49%	R1	82%	Pass	127%	Pass	Both MPT tests show pole still serviceable
A-3	14%	R3	70%	Pass	64%	Fail	Nondestructive MPT test shows borderline pass; destructive MPT test shows borderline fail.
A-4	50%	R1	75%	Pass	68%	Pass	Both MPT tests show pole still serviceable.
A-5	14%	R3	20%	Fail	23%	Fail	All methods agree pole serviceable.
M-1	59%	R1	92%	Pass	99%	Pass	Both MPT tests show pole still serviceable
M-2	24%	R3	92%	Pass	N/A	N/A	Nondestructive MPT test shows pole serviceable (not destructive tested)
M-3	48%	R1	84%	Pass	69%	Pass	Both MPT tests show pole still serviceable
M-4	59%	R1	84%	Pass	66%	Pass	Destructive shows pole near pass, nondestructive shows fail status.
M-5	52%	R1	73%	Pass	77%	Pass	Both MPT test show pole serviceable
A-1 to A-5 represent poles embedded in concrete pavement; M-1 to M-5 represent poles embedded in soil; R1 represents rejected nonreinforceable pole; and R3 represents priority rejected pole.							

## FORT GORDON TESTS

Although lacking an independent laboratory comparison test, Georgia Power nonetheless felt more confident seeing the reasonably close agreement of the nondestructive tests with the observed destructive tests. It also felt that the upcoming NEETRAC tests would further prove the worth and accuracy of the MPT technology. With this confirmation in hand, Georgia Power wanted to do

additional testing. The late 2006 conventional inspection and treatment of poles in Fort Gordon and in the Atlanta operating area gave the utility an ideal opportunity.

The company had seen an above-average reject rate in Atlanta and Fort Gordon. The utility also knew how compelling the business case is for extending the life of a pole. Although it could not justify retesting all 50,000 poles in Atlanta, or all 4500 in Fort Gordon, Georgia Power knew it would only have to avoid replacing a small percentage of the reject poles with the MPT tests to make a good return on its investment.

Dr. Deuar was asked to test 234 rejected — and destined for replacement — poles in the Atlanta and Fort Gordon areas. All of these poles had been found unserviceable in early 2007 by conventional ground line inspection. Poles were selected for MPT that were high-cost replacement poles, those with either transformer banks, electrical junctions or other equipment that made replacement more expensive than simpler poles. Of the 234 conventionally rejected poles, 132 poles (56%) were evaluated by the MPT tests as being still serviceable.

Looking at the financial side of this approach, for its business case, Georgia Power established or assumed (historical records):

- \* The average cost of replacement of one of these rejected poles was estimated to be around \$4000.

- \* The cost of testing each pole was approximately \$200, which was relatively high as only a few widely scattered poles were chosen. Startup costs also were a big part, because all the men and equipment had to come from the other side of the globe for this project only. It is expected that these costs will come down as the process becomes more automated and the number of poles tested rises in a given cycle.

As a result, the cost savings were as follows:

- \* Cost of pole testing  $234 \times \$200 = \$46,800$
- \* Cost saved on pole replacements  $132 \times \$4000 = \$528,000$
- \* Net savings  $\$528,000 - \$46,800 = \$481,200$ .

The costs savings were all on the capital side of the financial analysis; the testing was an operating cost. Most utilities, Georgia Power included, regard these costs differently, but these savings are significant in any form of cash.

## SAFETY IMPACT

From a safety standpoint, it also should be noted that out of 102 failed poles, the MPT found 21 poles (21%) to be much weaker than originally predicted by the conventional pole inspection methods. This allowed Georgia Power to place a higher priority on those poles that were previously thought to be low-priority replacements or reinforcements.

The traditional methods of testing a pole's strength — by hammering, listening to the pole's echo and boring — are recognized to be pretty unreliable. Most traditional pole testing methods assume consistent wood strength by species, age and remaining amount of good wood. Experience has shown these are false assumptions. Knowing a pole's species, age and degree of decay does not guarantee an accurate assessment of its remaining strength (or longevity). This knowledge can only be indicative of a pole's strength.

The initial stages of fungus growth, commonly known as an incipient decay, eludes all conventional methods of testing a pole's strength and, to date, can only be identified by costly microscopic examinations in a biological laboratory. It is not always detectable by drilling, yet incipient decay can reduce pole strength by up to 50%.

Additionally, more advanced internal decay or termite damage in a pole is often missed by drilling, especially if the pole cannot be fully excavated to inspect for belowground decay. Some Georgia Power poles had failed in-service due to belowground damage that had eluded inspectors.

#### AN EXCELLENT NEW TOOL

Georgia Power believes the recent field testing proves the MPT system is an excellent supplemental tool to conventional pole inspection and treatment methods. As the cost of the test is driven down by process improvements and higher volumes, it may even become more of a primary tool.

Although MPT cannot replace the remedial treatments performed by the traditional service providers, it could prevent the need to replace or reinforce poles that are either heavily loaded or found to have significant decay, rejected by conventional evaluations.

The business case is already convincing to support the use of MPT for performing a follow-up evaluation of poles rejected by the conventional inspection methods. For poles that a utility is unable to excavate, MPT also may be used to more accurately evaluate remaining strength, removing significant risk for the utility.

#### DATA TABLES

- \* Table 1. Reject Poles Life Extended with MPT 40 Tests
- \* Table 2. Weak Poles Discovered (Risk Removed) with MPT 40 Tests (Not Rejects Previously)
- \* Table 3. Poles Where MPT 40 Tests Agreed with Conventional Evaluation (Rejects Only)
- \* Table 4. Comparison of Results Nondestructive MPT, Destructive MPT and Conventional

#### ACKNOWLEDGEMENT

The author thanks Dr. Kris Deuar for his assistance during these pilots and Troy M. Doyle of ONE Management Consulting Services, Dr. Deuar's North American representative.

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**Table F.1.1-1 Actual and Forecast Annual Peak Demand for the Santa Cruz Service Area.** The actual observed values, in the second column, show the actual annual peak demand in MW, with forecasts that are “higher” than forecast in red and “lower” than forecast in blue. Each 10 MWhr is shaded in a different background color. Newer forecasts are to the left and older to the right. Above the line between 2006 and 2007 indicates “history” which future demand predictions are below.

EXHIBIT

MM - 5

REAL WORLD Data		FORECAST PEAK DEMAND for the Santa Cruz Service Area															
Year	ACTUAL Peak Demand	Ref 16	Ref 15	Ref 14	Ref 13 3% growth	Ref 12 5% growth	Ref 11	Ref 10 slow	Ref 9	Ref 8	Ref 7 Hot	Ref 6 High	Ref 5 Normal-ized	Ref 4 Hot	Ref 3 Normal	Ref 2	Ref 1
Year of Forecast		May 2008	May 2008	Oct 2007	Mar 2007	Mar 2007	Dec 2006	Oct 2005	July 2005	June 2004	Feb/Apr 2004	Feb/Apr 2004	Feb 2004	2000	2000	1999	1998?
1993	40.0																
1994	43.7																
1995	41.6																
1996	41.9																
1997	42.5																
1998	45.3																
1999	50.36																
2000	52.60																
2001	50.54																
2002	57.99																
2003	57.636																
2004	60.768																
2005	69.408																
2006	73.152																
2007	No Data																
2008	No Data	75.55	78.31	76	76.1	76.1	76.5	76.5	65.3	68.1	68.0	70.1	73.5	68.2	76.0	70.5	
2009		76.99	81.40	77	78.4	79.9	79.1	77.0	66.7	69.4	69.5	72.2	75.8	70.3	78.0	73.0	
2010		78.45	83.79	78	80.7	83.9	81.7	78.5	68.1	70.8	71.0	74.5	78.2	72.5	80.0	74.0	
2011		79.93	86.53	80	83.2	88.1	84.3	79.9	69.4	72.2	72.5	76.8	80.6	74.7			
2012		81.45	89.10	81	85.7	92.5	86.9	81.5	70.8	73.6	74.0	79.2	83.1	77.0			
2013		83.00	91.79	83	88.2	97.1	90		72.2	74.9	75.4	81.6	85.7	79.4			
2014		84.62	95.00	85	90.9	102.0	92		73.6	76.1	76.7	84.1	88.3	81.8			
2015		86.17		86	93.6	107.1	95		74.9	77.3	78.8	86.7	91.0	84.3			
2016		87.51			96.4	112.4	98		76.1	78.5	79.3						
2017		88.99			102.3	118.1	101		77.3	79.7	80.6						
2018		90.33				124.0	103		78.5	80.9	81.9						
2019		91.58					105		79.7	82.0	83.3						
2020		92.80					107		80.9	83.3	84.6						
		<div>Forecast Peak Demand Data</div>															

Historical Peak Demand Data

Forecast Peak Demand Data



**Table F.1.1 Actual and Forecast Annual Peak Demand for the Santa Cruz Service Area.** The actual observed values, in the second column, show the actual annual peak demand in MW, with forecasts that are “higher” than forecast in red and “lower” than forecast in blue. Each 10 MWhr is shaded in a different background color. Newer forecasts are to the left and older to the right. Above the line between 2006 and 2007 indicates “history” which future demand predictions are below.

EXHIBIT

MM - 5

FORECAST PEAK DEMAND for the Santa Cruz Service Area															
REAL WORLD Data		Ref 16	Ref 15	Ref 14	Ref 13	Ref 12	Ref 11	Ref 10	Ref 9	Ref 8	Ref 7	Ref 6	Ref 5	Ref 4	Ref 3
Year	ACTUAL Peak Demand	May 2008	May 2008	Oct 2007	Mar 2007	Mar 2007	Dec 2006	Oct 2005	July 2005	June 2004	Feb/Apr 2004	Feb-/Apr 2004	Normal-ized	Hot	Normal
Year of Forecast															
2021		93.95					109		82.0		86.2			2000	1998?
2022		95.05							85.3		88.0			2000	
2023		96.09									95.6				
2024		97.07									91.6				
2025		97.99									93.4				
2026		98.97									95.3				
2027		99.96									97.2				
2028		100.96									99.1				
2029											101.1				
2030											103.1				
2031											105.2				
2032											107.3				
2033											109.4				
2034											111.6				
2035											113.9				
2036											116.1				
2037											118.5				
2038											120.8				
2039											123.2				
2040											125.7				

Historical Peak Demand Data

Forecast Peak Demand Data

**\*Actual Peak Demand (1993 to 2006)** – From UES website (27 May 2009), corrected 2005 peak data. In the UNSE Rate Case, ACC Docket E-04204A-06-0783, the peak loads for 2006 and 2005 were given as 71.7 MW and 69.6MW, but in UNSE Response to STF 1.1. In UNSE response to MM DR 1.15 the peak load for 2006 was provided by UNSE to be 73.152 MW was provided as the 2006 peak load. In this UNSE response to MM DR 1.15, the peak load demands for 2003 through 2006 were provided which included a 2003 peak at 54.144 MW that occurred after 11 Aug 2003, under UNSE, while the actual 2003 peak occurred under Citizens at 57.64 MW earlier that summer. Additional peak data were in TEP's response to MM Data Request 221.c in ACC Docket E-01032A-99-0499

**FORECAST DATA:**

**(Ref 16) UNSE Generation Forecast.** From <http://qawww.uesaz.com/Wholesale/ResPlan.asp> on 27 May 2008.

**(Ref 15) UNSE Forecast,** UNSE Conversion from Point-to-Point Service to Network Integration Transmission Service, report for WAPA, dated 22 May 2008, in response to DR 1-1 in Line Siting Case 144.

**(Ref 14) Santa Cruz Peak Demand Forecast,** UES website 27 May 2008 (date is not on the page, Oct 200 is shown), similar format as Ref 11.

**UNSE Rate Case (Ref 13) 3% growth, (Ref 12) 5% growth (Mar 2007)** – In UNSE's response to MM Data Request 1.15 (Excel spread sheet) in ACC

Docket E-04204A-06-0783 for years 2008 through 2018 using a 3% and 5% growth rates.

**(Ref 11) UNS Electric and SEC (Dec. 2006)** – For 2005 to 2012, from Testimony of Ed Beck in UNS Electric Rate case ACC Docket E-04204A-06-0783 and from 2013 to 2021 from the UniSource SEC Form 25 submitted in Dec 2006 and Exhibit MJD-1 to Michael DeConcini in the above UNS Electric Rate case. The SEC filing also included the earlier years, rounded off to an even MWhr as Weather Normalized Peak Demand Forecast.

**(Ref 10) UNSE "Very Slow" Scenario (Oct 2005)** – From UNSE Annual Peak Load Forecast, emails in March 2006, from MM Data Request 1.9.g in ACC Docket E-04204A-06-0783.

**(Ref 9) TEP/UNS (July 2005)** – From Beck Testimony of 8 July 2005, Exhibit 3 (Annual Peak Load Forecast for Santa Cruz County)

**(Ref 8) UNS Electric (June 2004)** – From UES "Long-term Transmission Plans for Santa Cruz County UNS Electric System," June 2004. For years 2021 and later, the forecast is extrapolated based on a 2% growth factor.

**TEP (Ref 7) Hot, (Ref 6) High, and (Ref 5) Normalized Forecast (Feb/April 2004)** – From Exhibit 4 (February 2004) where TEP forecast is for the average year (also in the RMR report for 2005, 2008, 2012) and the "high" for years that are hotter than normal.<sup>1</sup> This also has been published as "Nogales Retail Peak Forecast – April 2004:" with the years 2004 to 2020 designated as the "UniSource Forecast (MW)" and the years 2021 to 2040 as "Extrapolated Forecast (2% growth factor (MW))

**UniSource Energy Services** – Loads & Resources Peak (weather normalized) Demand Forecast (used by UniSource for the competition for a new Purchase Power Agreement for Santa Cruz County (February 2004)

**RAC2 (Ref 4) Hot, (Ref 3) Normal (2000)**, Testimony of Rasel Craven, Citizens Director of Engineer, May 1, 2001, Docket No. L-00000C/F-01-0111, Line Siting Case No. 111, as Exhibit RAC-2, which indicated on June 30, 2000, a record of 50.2 MW was reached (marked by A) above. Values for 2001 to 2003 are from testimony, from 2004 to 2010 from Exhibit 4 (February 2004) as footnoted above. The "normal" and "hot" were for years which were average or higher than average. The R.W. BECK & Co. determined the RAC-2 forecasts in early 2000.

**(Ref 2) Citizens' Cost-Benefit Analyses (1999)** of Transmission-Line Alternatives, ACC Docket E-01032A-98-0611 in Exhibit F of July 13, 1999 at Nogales Tap for "normal weather."

**(Ref 1) Citizens Briefing (1988)** given to the Joint Santa Cruz County/City of Nogales Energy Commission in February 2001; however, content appeared to be dated about 1988.

<sup>1</sup> See Exhibit 4 from the TEP and UES "Response to Commission Questions and Updated Response Plan for Santa Cruz County" of 9 February 2004, in Docket No. E-01032-99-0401.

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# UES - ENERGY FORECAST

SALES BY DIVISION BY MONTHLY PERIOD

001120

SALES FORECAST BY DIVISION	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
RETAIL SALES (GWH)												
SANTA CRUZ	778.9	749.4	747.0	749.5	747.5	749.8	749.5	747.4	747.4	747.4	749.6	3
MOHAVE	1,225.1	1,320	1,425	1,521	1,618	1,699	1,774	1,848	1,923	2,001	2,076	3
TOTAL RETAIL ENERGY (GWH)	1,504.0	1,669.4	1,772.0	1,870.6	1,966.3	2,029.3	2,093.0	2,140.3	2,249.3	2,348.5	2,425.2	2.0
ESTIMATED SYSTEM LOSS FACTOR	5.5%	5.6%	5.7%	5.8%	5.9%	6.0%	6.1%	6.2%	6.3%	6.4%	6.5%	6
GENERATION REQUIREMENTS (GWH)												
SANTA CRUZ	872.8	873.6	873.1	872.7	871.8	870.1	869.7	868.1	867.9	866.7	866.4	3
MOHAVE	1,361.8	1,471.6	1,577.2	1,684.2	1,790.2	1,898.2	1,997.3	2,095.5	2,195.1	2,295.3	2,397.4	2.2
TOTAL RETAIL ENERGY (GWH)	1,440.7	1,782.6	1,886.4	2,125.4	2,277.3	2,471.7	2,556.8	2,682.7	2,822.3	2,958.6	3,077.8	3
LOAD FACTOR (%)												
SANTA CRUZ	53.16%	48.42%	48.41%	48.57%	48.45%	48.45%	48.42%	48.37%	48.45%	48.56%	48.49%	10
MOHAVE	44.31%	47.08%	47.58%	47.84%	47.71%	47.73%	47.77%	47.81%	47.82%	47.82%	47.83%	40
TOTAL RETAIL ENERGY (%)	43.74%	45.31%	47.50%	47.95%	47.79%	47.87%	47.87%	47.89%	47.87%	47.89%	47.89%	45
PEAK DEMAND GROWTH (%)												
SANTA CRUZ	8.07%	4.42%	1.99%	1.54%	1.90%	1.90%	1.84%	1.90%	1.91%	1.95%	1.94%	1
MOHAVE	14.89%	10.98%	8.75%	16.81%	9.43%	7.96%	6.79%	5.98%	4.87%	4.48%	4.70%	3
TOTAL RETAIL DEMAND (MW)	13,884	9,327	7,744	14,384	8,419	6,864	6,634	4,874	4,604	4,494	3,784	3
ENERGY GROWTH (%)												
SANTA CRUZ	1.03%	4.04%	1.99%	1.54%	1.90%	1.90%	1.84%	1.90%	1.91%	1.95%	1.94%	1
MOHAVE	7.84%	6.44%	6.62%	14.83%	8.03%	7.03%	6.17%	5.37%	4.87%	4.47%	4.71%	3
TOTAL RETAIL ENERGY (GWH)	5,365	8,864	6,524	12,874	7,464	6,314	6,554	4,924	4,464	4,454	3,744	3

## Santa Cruz - Generation Forecast 2008 - 2028

## Santa Cruz Generation Requirements, MWh

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2008	27,966	21,492	24,569	25,415	27,598	31,263	40,631	30,375	23,567	21,643	21,142	25,543	321,204
2009	28,500	21,901	25,035	25,896	28,119	31,857	41,407	30,948	24,014	22,065	21,537	26,028	327,308
2010	29,039	22,312	25,522	26,401	28,645	32,455	42,190	31,547	24,481	22,474	21,935	26,520	333,521
2011	29,603	22,741	25,996	26,890	29,174	33,080	43,007	32,129	24,935	22,902	22,349	27,019	339,824
2012	30,152	23,174	26,490	27,401	29,729	33,710	43,832	32,739	25,409	23,335	22,769	27,532	346,271
2013	30,726	23,612	26,992	27,920	30,311	34,349	44,669	33,358	25,907	23,774	23,196	28,060	352,874
2014	31,329	24,058	27,519	28,465	30,881	35,022	45,550	34,010	26,415	24,237	23,646	28,611	359,743
2015	31,942	24,522	28,030	29,008	31,467	35,662	46,382	34,622	26,888	24,666	24,059	29,103	366,351
2016	32,484	24,935	28,518	29,494	31,990	36,256	47,160	35,194	27,332	25,071	24,451	29,577	372,462
2017	33,016	25,339	28,961	29,951	32,505	36,841	47,921	35,754	27,752	25,451	24,820	30,032	378,343
2018	33,519	25,722	29,415	30,419	32,990	37,392	48,639	36,284	28,163	25,825	25,182	30,468	384,017
2019	34,012	26,096	29,825	30,841	33,444	37,907	49,314	36,781	28,550	26,176	25,521	30,883	389,350
2020	34,473	26,446	30,225	31,252	33,891	38,413	49,972	37,267	28,927	26,517	25,853	31,279	394,514
2021	34,923	26,788	30,615	31,655	34,326	38,884	50,588	37,721	29,278	26,837	26,162	31,655	399,431
2022	35,342	27,108	30,979	32,012	34,711	39,344	51,188	38,161	29,621	27,149	26,464	32,013	404,094
2023	35,734	27,406	31,317	32,379	35,108	39,771	51,745	38,572	29,940	27,438	26,743	32,351	408,504
2024	36,113	27,694	31,646	32,701	35,453	40,187	52,285	38,971	30,233	27,704	27,001	32,670	412,659
2025	36,464	27,960	31,949	33,031	35,789	40,568	52,784	39,335	30,516	27,962	27,250	32,969	416,579
2026	36,810	28,226	32,253	33,345	36,129	40,954	53,285	39,709	30,806	28,228	27,509	33,282	420,537
2027	37,160	28,494	32,559	33,662	36,472	41,343	53,791	40,086	31,099	28,496	27,770	33,598	424,532
2028	37,513	28,765	32,869	33,981	36,819	41,735	54,302	40,467	31,394	28,767	28,034	33,918	428,565

## Santa Cruz Coincident Peak Demand, MW

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2008	54.71	51.89	46.68	46.24	66.22	75.55	73.38	65.89	62.65	49.91	57.33	57.56	75.55
2009	55.75	52.88	47.57	47.12	67.48	76.99	74.78	67.14	63.84	50.86	58.41	58.65	76.99
2010	56.81	53.88	48.47	48.02	68.76	78.45	76.20	68.42	65.05	51.83	59.52	59.76	78.45
2011	57.88	54.90	49.38	48.93	70.06	79.93	77.64	69.71	66.28	52.81	60.65	60.89	79.93
2012	58.96	55.94	50.32	49.85	71.39	81.45	79.11	71.03	67.54	53.81	61.80	62.05	81.45
2013	60.11	57.01	51.28	50.80	72.75	83.00	80.62	72.39	68.83	54.83	62.98	63.23	83.00
2014	61.28	58.11	52.28	51.79	74.16	84.62	82.19	73.80	70.17	55.90	64.20	64.46	84.62
2015	62.40	59.18	53.24	52.74	75.53	86.17	83.70	75.15	71.46	56.93	65.38	65.65	86.17
2016	63.44	60.17	54.13	53.62	76.79	87.61	85.09	76.41	72.65	57.88	66.47	66.74	87.61
2017	64.44	61.12	54.98	54.47	78.00	88.99	86.44	77.61	73.80	58.79	67.52	67.80	88.99
2018	65.41	62.04	55.81	55.29	79.17	90.33	87.73	78.78	74.90	59.67	68.54	68.81	90.33
2019	66.32	62.90	56.58	56.06	80.27	91.58	88.95	79.87	75.94	60.50	69.49	69.77	91.58
2020	67.20	63.73	57.33	56.80	81.33	92.80	90.13	80.93	76.95	61.31	70.41	70.69	92.80
2021	68.04	64.53	58.05	57.51	82.35	93.95	91.25	81.94	77.91	62.07	71.29	71.57	93.95
2022	68.83	65.28	58.72	58.18	83.31	95.05	92.32	82.90	78.82	62.79	72.12	72.41	95.05
2023	69.58	65.99	59.37	58.81	84.22	96.09	93.33	83.80	79.68	63.48	72.91	73.20	96.09
2024	70.29	66.66	59.97	59.41	85.07	97.07	94.28	84.65	80.49	64.13	73.65	73.94	97.07
2025	70.96	67.30	60.54	59.98	85.88	97.99	95.17	85.46	81.26	64.73	74.35	74.65	97.99
2026	71.67	67.97	61.14	60.58	86.74	98.97	96.12	86.31	82.07	65.38	75.09	75.39	98.97
2027	72.38	68.65	61.76	61.18	87.61	99.96	97.09	87.18	82.89	66.04	75.84	76.15	99.96
2028	73.11	69.34	62.37	61.79	88.48	100.96	98.06	88.05	83.72	66.70	76.60	76.91	100.96

# SWTC Substation ID Info

XFORMER ID	Name	Org	Loading Year	SWTC Flow Diagram		Right	Left
				MW	MVAR		
17005	Bicknell	SWTC	2007	359.8	1.034	Vail	Bicknell 04
17005	Bicknell	SWTC	2017	357.1	1.035	Vail	Bicknell 04
17004	Bicknell	SWTC	2007	231.2	1.005	Bicknell 04	Bicknell 06
17004	Bicknell	SWTC	2017	231.9	1.008	Bicknell 04	Bicknell 06
17006	Bicknell	SWTC	2007	114.8	0.998	Bicknell 05	Sahuarita 02
17006	Bicknell	SWTC	2017	115.8	1.007	Bicknell 05	Sahuarita 02
16105	Vail	TEP	2007	356.8	1.034	Winchester	Bicknell 05
16105	Vail	TEP	2017	356.9	1.034	Winchester	Bicknell 05
17105	Winchester	TEP	2007	358.1	1.038	Greenlee	Vail
17105	Winchester	TEP	2017	358.2	1.038	Greenlee	Vail
17102	Sahuarita	SWTC	2007	231.6	1.007	Bicknell 06	Pantano 16
17102	Sahuarita	SWTC	2017	232.4	1.009	Bicknell 06	NewTucson
17676	NewTucson	SWTC	2017	232.4	1.011	Sahuarita	Pantano 16
17016	Pantano 16	TEP	2007	232.8	1.102	Sahuarita	Pantano 15
17016	Pantano 16	TEP	2017	232.7	1.112	Sahuarita	Pantano 15
17015	Pantano 15	TEP	2007	116.3	1.011	Pantano 16	NGL-WALC
17015	Pantano 15	TEP	2017	116.1	1.009	Pantano 16	NGL-WALC
17015	Pantano 15	TEP	2007	116.3	1.011	Pantano 16	Adams 50
17015	Pantano 15	TEP	2017	116.1	1.009	Pantano 16	Adams 50
19221	NGL-WALC	UNSE	2007	112.5	0.978	Pantano 15	UNSE
19221	NGL-WALC	UNSE	2017	112.6	0.979	Pantano 15	UNSE

BEFORE THE ARIZONA POWER PLANT AND  
TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF UNS  
ELECTRIC, INC. FOR A CERTIFICATE OF  
ENVIRONMENTAL COMPATIBILITY FOR THE  
VAIL TO VALENCIA 115 KV TO 138 KV  
TRANSMISSION LINE UPGRADE PROJECT,  
ORIGINATING AT THE EXISTING VAIL  
SUBSTATION IN SEC. 4, T.16S., R.15E., PIMA  
COUNTY, TO THE EXISTING VALENCIA  
SUBSTATION IN SEC. 5, T.24S., R.14E., IN THE  
CITY OF NOGALES, SANTA CRUZ COUNTY,  
ARIZONA.

Docket No. L-00000F-09-0190-00144

Case No. 144

WITNESS SUMMARY  
FOR MARSHALL MAGRUDER

29 May 2009

Submitted to the Arizona Power Plant and Transmission Line Siting Committee and parties in  
accordance with Procedural Orders of 27 April 2009 and 20 May 2009 for Line Siting Case No. 144.

Personal Background.

I am Marshall Magruder, from Tubac, Arizona, UNS Electric ratepayer. Having served on the  
Santa Cruz County/City of Nogales Joint Energy Commission, I have gained a detailed understanding  
of our county's electricity utilities. My resume is an Attachment, but my "Large systems" systems  
engineering experience, gives a unique perspective. Many consider system engineers as best of  
breed. We usually are the first to really look at the "need" for a system. I've lead many requirements  
analysis teams to determine what is necessary to solve somebody's problem. Finding the "best"  
solution is what systems engineers do for a living. It takes several approaches before the "best" is  
found. We say it's really not designed until Rev C, the fourth revision. We "bracket and half",  
overshoot, and then undershoot, decreasing error each time. No one knows the "best" solution in  
isolation. Only when teams, an integrated product team (IPT), with all disciplines represented, such as  
your committee, can all the necessary environmental factors are put on the table. Reviewed and  
analyzed, then synthesized into a Product or Project. The "total environmental" requirements for this  
committee are about a broad a term as possible.

Background of a Project Review.

All factors need review. This Committee would not exist if human judgments were not required to  
assess the many unknown impacts. The A.R.S. 40-360 statutes specify a committee from various  
backgrounds. Some factors aren't included; others may not be key players in every decision. For  
years, I had psychologists on my projects, because they come from a different discipline, with

1 different and diverse points of view, and usually are the best at understanding how "people" will  
2 change or should use the "system." In fact, many systems are redesigned if this discipline is not  
3 property employed at the "needs assessment" phase of requirements analysis. Another key discipline  
4 is reliability engineering, the engineering specialist critical to "keep it operating". Through simple, well  
5 sometimes rather complex, through probability analysis, failures are predicted and sequenced, as  
6 they cascade through a system. We do this over and over again, changing the design, so that high  
7 failure items always have redundancy designed into the system. Use of mean time between failure  
8 and mean time to repair permits one to estimate rather closely when a system will fail and usually  
9 what component will fail first. Usually, that "first to fail" component is redesigned so a new "first to fail"  
10 component emerges. And we repeat that process again. Reliability engineering is not used in the  
11 electric utility industry, other than at nuclear power plants, probably because of the heavy influence of  
12 Admiral Rickover trained nuclear engineers who are top-notch professionals.

#### 13 Issues Related to the Project.

14 For the "Vail-Valencia 138 kV upgrade", I am not yet convinced a "need" really exists, nor if the  
15 WAPA to TEP transmission services change is "best" for Santa Cruz County ratepayers.

16 The major concern is changing the northern terminal for the transmission line from the WAPA  
17 Nogales Tap to the TEP Vail Substation. DOES this really benefit for Cruz County ratepayers in terms  
18 of economic, energy (electricity) and total environmental factors.

19 At this stage, with discovery questions not been fully answered, I'm unsure about the "need" and  
20 cost-benefit for customers this project.

21 Some questions I plan to explore during witness cross-examination include:

- 22 1. The Application seems to indicate that WAPA has a 50.9 MW "constraint" on providing electricity  
23 to the Nogales Tap. In response to my Data Request 1.1, the Company's report stated that after  
24 December 2008, an upgrade in the WAPA transmission line would add a tap at the Pantano  
25 substation that increases this "constraint" to 65.8 MW. (Exhibit MM-1, DR 1.1 response)
  - 26 a. What is the WAPA constraint?
  - 27 b. How does this constraint change?
  - 28 c. What is the impact of EPA of 2005, section 1221, which provided up to \$500 million annually  
29 for 5 years to remove WAPA transmission constraints?
  - 30 d. What is WAPA's future plans for the Sahuaro-Pantano 115 kV line?
  - 31 e. When has 50.9 MW actually been the maximum power delivered by WAPA?
  - 32 f. How much does WAPA charge to use its transmission system, e.g., the wheeling charges in  
33 \$ per kW-month?
- 34 2. What are the differences between using the Nogales Tap and Vail substations?
  - 35 a. What are the respective transmission line charges, and the differences impact on  
36 ratepayers? [TEP was \$2.33/kW-month in 2001]
  - 37 b. What are the transmission (energy) losses differences on each transmission system? [WAPA  
38 was approximately 4.95% in 2001, Nogales Tap to delivery was approximately 10.45%]



- c. What equipment owed by UNS Electric at the Nogales Tap will not be used after a potential transfer to Vail and what is its cost? [\$2.1M switch Exhibit MM-2]
  - d. How much new equipment will be required at Vail to support UNS Electric and what is its cost?
  - e. Can the Citizens' installed three-ring bus switch be used by changing from Apache to Vail, with an inline 115:138 kV transformer, so that both the Nogales Tap and Vail substations can provide two different power sources to support UNS Electric? (Exhibit MM-2)
3. Do these poles really require replacement? (Exhibit MM-3)
    - a. Has the company tested these poles to determine if they require replacement?
    - b. What do the UNSE statistics on pole failure on this line indicate? (DR refused)
    - c. What are the reliability statistics on this transmission line? (DR refused)
    - d. What are the new objective reliability measures that show the improvement before and after pole replacement? (DR refused)
    - e. What will be the change in total capacity of the 138 kV compared to the existing 115 kV? [Present line thermal limit is 132 MW except at southern end, new 138kV has 120 MW capacity => no change] (Exhibit MM-4)
    - f. Validation of Peak Demand forecasts for SCC. (Exhibits MM-5, MM-6, and MM-7)
    - g. What and where will the conductor be replaced?
    - h. Where will the existing poles and acquired right-of-way not be adequate for pole replacement?
    - i. Where will cor-ten poles and dulled galvanized steel poles be sited?
  4. What are the UNS Electric Renewable Energy Transmission Project's impact on the WAPA 115 kV line to Nogales Tap? (Exhibit MM-8)
    - a. How will UNS Electric perform on this contract if there is no Nogales Tap?
    - b. How will the two 230 kV new WAPA lines plus the 230 kV line to Pantano impact Santa Cruz County?
    - c. If WAPA has adequate future supply adequate to meet the load demands, other than changing poles, is there any other reason for this project (other than TEP receiving wheeling charges)?
  5. What are the plans for archeological and biologic professionals to survey for unexpected disturbance of archeological sites and plant life?
    - a. How will OHV traffic on maintenance roads be curtailed?
    - b. How will construction and restoration be performed to return the disturbed lands back to its original conditions?
  6. Will there be any public process or dialog occurring after the CEC is granted?
    - a. Will there be different groups for the UNSE and TEP customers?
    - b. Where and how frequent will these briefing and discussion sessions occur?
    - c. Will they be open, advertized, and make public?
    - d. Does the company see that such meetings can improve its image?
    - e. Will a website and any newsletter be used after CEC approval?
  7. How much will this project really cost?
    - a. What are the component costs for each segment?
    - b. Where will you deviate from the existing 100-foot wide ROW, when replacing poles?
    - c. On new ROW, how close will your 100-foot wide ROW be with respect to the UPRR ROW, in other words, is your ROW directly adjacent to the RR?

Prefiled Testimony.

My Prefiled Direct Testimony is planned to provide the background and discuss these and related issues but, in general, most of these questions are planned for cross-examination. It will not be ready until AM Monday and will be put into the "box" for each Committee person staying at the Rio Rico Esplendor Hotel by noon and available by 0800 on 2 June for others.

Exhibits.

Exhibits in this Summary are to be provided before the hearing to the Committee and parties.

Pre-Filed Exhibits (all have been provided to the Applicant)

- MM-1 UniSource Energy Services – UNS Electric (Santa Cruz) System Conversion from Point-to-Point to Network Integrated Transmission Service, 22 May 2008 (in DR 1-1 response)
- MM-2 Citizens Plan of Action Excerpt (sent to UNSE via email)
- MM-3 Article from T&D on Pole Replacement practices (provided as a handout 26 May)
- MM-4 Excerpt from Magruder Testimony 8 July 2005 (conductor capacities)
- MM-5 Peak Demand Forecasts for Santa Cruz County (various sources since 2000)
- MM-6 UES Loads and Resources Peak Demand Forecast (UES website)
- MM-7 Santa Cruz Generation Forecasts 2008-2028 (UES website)
- MM-8 UES Letter to WAPA Transmission Infrastructure Program (p. 30-36) (in DR 1-3 response)
- MM-9 SWTC Substation ID Info
- MM-10 Magruder Witness Summary (this document less other exhibits)

Mailed to all parties and DATED this 29th day of May 2009.

Respectfully submitted,

Marshall Magruder  
PO Box 1267  
Tubac, AZ 85646  
[marshall@magruder.org](mailto:marshall@magruder.org)  
520.398.8587

Attachments

A. Resume of Marshall Magruder

**Service List**

Docket Control (Original and 25 copies)	400 East Van Buren Street, Suite 800
Arizona Corporation Commission	Phoenix, Arizona 85004
1200 West Washington Street	Marc Jerden
Phoenix, Arizona 85007	Tucson Electric Power Company, Legal Department
Charles Hains, Janice Alward, Chief Counsel	One South Church Avenue, Suite 200
Arizona Corporation Commission	PO Box 711
1200 West Washington Street	Tucson, Arizona 85702-0711
Phoenix, Arizona 85007	Elizabeth Buchroeder-Webb
Jason D. Gellman, J. Matthew Derstine	17451 East Hilton Ranch Road
Roshka DeWulf & Patten, PLC	Vail, Arizona 85641
One Arizona Center	

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## Attachment A

### RESUME OF MARSHALL MAGRUDER

#### EDUCATION

MS in Systems Management, University of Southern California (1981); MS in Physical Oceanography, Naval Postgraduate School (1970); BS, US Naval Academy (1962)

#### EXPERIENCE

Over 25 years as Systems Engineer associated contractor, consultant, Raytheon-Hughes in systems engineering, training and naval systems, C4I simulation and modeling; over 40 years experience with 25 years US Navy

##### ☐ **Large-system development** at all levels

**From** pursuit, analysis, winning strategy, Request for Proposal evaluation, proposal management, system requirements analysis, architectures, specifications, design synthesis, trade-off studies, requirements allocation tracking,

**To** system, level test planning, deployment, implementation, through sign-off,

**For** technical systems of all complexities.

☐ **Developed** Antisubmarine Warfare, Electronic Warfare, Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance operational concepts, procedures, and tactical employment.

☐ **Used, operated, and planned** Navy, Army, Air Force, Coast Guard, Joint systems, world-wide.

☐ **Coordinated multi-platform employment** from sensor to tactical platform to Battle Force to Theater levels.

☐ **Qualified systems engineer-manager** for trainers, artillery, Command & Control, countermeasures, any platform.

☐ **Specialties:** environmental analysis, documentation, sensor/weapon predictions, C4ISR, Electromagnetic and Emission Control (EMCON) decision criteria.

☐ **Battle Force/Group Tactical Action Officer** on 8 aircraft carriers, TAO Instructor, 20 months combat.

#### RECENT POSITIONS

**Commissioner, Santa Cruz County/City of Nogales Joint Energy Commission** (2001-2008), intervened in Line Siting Case No. 111 and 144; Rate Cases (two Natural Gas, one Electric, one Water), Renewable Energy Standard participation, and various other ACC issues.

**C4I Architect and C4I Support Plan Lead** for the Carrier for the 21st Century (CVX) Delivery Task.

- Completed CVX *C4I Support Plan, v1.0*, Joint Operational Architecture development for Joint and Naval staff space allocations for CVX (1999) and Joint Command and Control ship (2002).
- Drafted CVN 77 *Electronics System Integrator Statement of Work* for WBS Group 400 tasks and IPTs (1999), *Integrated Management Plan*;
- **Royal Navy Future Aircraft Carrier** WBS proposal (2002)

**Lead Systems Engineer, Operations Analyst and Site Survey Leader** for Saudi Arabian Minister of Defense National Operational Command Centers and C4I System (completed August 1997).

- Completed *System Specification, System Description Document, Site Survey, Interface Requirements Documents*

**Proposal Technical Volume Manager** for the following **winning proposals**:

- **Vessel Traffic Service 2000 system**, US Coast Guard command center for surface surveillance using radar, visual, communications links. (evaluated A++, won Phase I, Phase II delayed then restructured)
- **Anti-submarine Warfare Team Trainer** (Device 20A66), an integrated, multi-ship, submarine and aircraft training system for Naval Task Groups. (\$56M contract, best technical, lowest cost)
- **Electronic Warfare Coordination Module**, an Intelligence/EW spectrum planning and management system for Task Force Command Centers. (won Phase I, best technical)

**Program Manager for the Border Patrol Strategic Border Initiative and National Training Center** (2008)

- Training Standards for Border Patrol personnel performing maintenance on Virtual Fence equipment, establish a National Border Patrol Training Center with interactive and life-time Performance Measurement

Subsystem, for maintenance and operational personnel.

**Assistant Program Manager for the Training Effectiveness Subsystem, Device 20A66**

- Performance Measurement Subsystem, observed real-time performance of operators, teams, multi-ship and aircraft units during exercises and compared to the standard

**Senior Systems Engineer** responsible for writing **specifications** in following **proposals**:

- **Fire Support Combined Arms Team Trainer** *System Specification*, a US Army field artillery multiple cannon and battery training system. (awarded \$118M contract, still under contract)
- **Warfighter's Simulation 2000 (WARSIM 2000)** *System Specification*, a US Army Force XXI Century battalion to theater levels, training system with actual C4I systems. (won Phase I)
- **US Navy Tactical Combat Training System**, *Exercise Execution Software Requirements Specification* for simulation and computer models to run real-time, driving sensors, weapons and links on 35 ships, 100 aircraft and submarines (won Phase I contract, wrote SRS in Phase 2 proposal)
- **US Army Virtual Proving Ground (VPG)** - Performed *C4ISR Architecture Framework* development, implementation and documentation using the DoD *Architecture Framework*, for Operational, Technical and Systems architecture products. (2001-2002).
- **MBA Instructor, University of Phoenix**, for "Operations Management for Total Quality" and "Managing R&D and Innovation Processes" courses.

**January 1998 to present – H&R Block, Senior Tax Advisor Level III**, seasonal tax preparer (January to April 15), part time, **AARP Tax Consulting for the Elderly** (pro bono) tax preparer, IRS qualified.

**Networthiness Certification (Jan. 2005-2007)**, prepared proposal for the Army Network Command (NETCOM), for this several million-dollar program involving over 3,200 Army computer programs at all Army installations, worldwide. Prepared Quality Control and Risk Management Plan.

**Cryptologic Support and Logistic Analysis (Oct. 2004-2006)**, prepared proposal for Army Communications-Electronics Command, Ft. Huachuca, Arizona.

**Proposal Manager, Law Enforcement Driver Trainer System for California.**

Led pre-proposal and proposal team to develop a design for high-technology driver trainer systems for the Peace Officers and Safety Training (POST) Commission. (Hughes won)

**AWARDS**

Arizona Golden Rule Citizen Award, by Arizona Secretary of State Janice K. Brewer for exemplifying the spirit of the Golden Rule daily: "treat others the way you would like to be treated", nomination made by Santa Cruz County Supervisor Ron Morris, of August 2004 for accomplishments on the Santa Cruz County/City of Nogales Joint Energy Commission.

Merit Award, Raytheon and Hughes, four times, for achievement and excellence in performance.

National Security Industrial Association (NSIA) Anti-Submarine Warfare Committee, Meritorious Award from the NSIA President, Admiral Hogg USN (ret), for leading ASW training industry and government studies. (1992)

Military Awards include Meritorious Service Medal, Naval Commendation Medal with Combat "V" and Gold Star, Navy Unit Commendation, Navy Meritorious Unit Commendation, National Defense Medal, Armed Forces Expeditionary Medal (Dominican Republic), Vietnam Service Medal with three Bronze Stars, Vietnam Campaign Medal with "1960-", Overseas Service Ribbon (Italy).

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## Exhibits

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**From:** Tara Williams  
**To:** Ippolito, Mary  
**Date:** 6/1/2009 8:46 AM  
**Subject:** Fwd: Court Reporters Attendance at Committee Tours of Sites  
**Attachments:** Court Reporters Attendance at Committee Tours of Sites

Please see attached.

Thank you,  
Tara Williams  
Assistant  
Consumer Protection & Advocacy Section  
Office of the Attorney General  
Tel: (602) 542-7759  
Fax: (602) 542-4377  
tara.williams@azag.gov

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Arizona Court Reporters Association

# Arizona Reporting Service, Inc.

## Court Reporting & Videoconferencing Center

e-mail: [azrs@az-reporting.com](mailto:azrs@az-reporting.com)  
[www.az-reporting.com](http://www.az-reporting.com)



Marta T. Hetzer  
Administrator/Owner

Suite 502  
2200 North Central Avenue  
Phoenix, AZ 85004-1481  
MAIN (602) 274-9944  
FAX (602) 277-4264

E-mail and First Class Mail

Friday, May 29, 2009

Chairman John Foreman  
Power Plant and Transmission Line Siting Committee  
c/o The Attorney General's Office  
1275 West Washington Street  
Phoenix, AZ 85007

Re: Court Reporter attendance at Committee Tours of Sites

Dear Chairman Foreman:

We regret to inform you that we are not able to accept assignments to attend and preserve a record at committee tours of sites. We understand and appreciate that at this time your needs include making and preserving a record at these tours and we remain available to be of any assistance to you arranging for the transcription, by a certified transcriptionist, of any audio recording you may make at these tours. Perhaps, you might consider accepting our assistance arranging for a videographer; and our offer to arrange for the transcription of the audio would still stand.

In our professional opinion and judgment we are not able to consistently capture a verbatim record and be able to certify the same, with so many variables from event to event and from court reporter to court reporter, all things considered including the elements. We have visited this issue with three of the previous chairpersons of the committee, and each time it was determined that we could not capture, transcribe, and certify a verbatim record.



Page 2 of 2

Friday, May 29, 2009

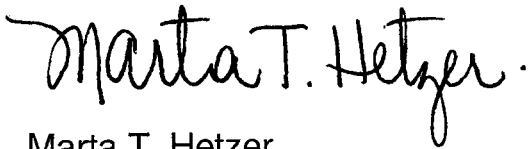
Chairman John Foreman

Re: Court Reporter attendance at Committee Tours of Sites

Our firm and our predecessors have produced transcripts of every Line Siting Committee hearing, going back to Case No. 1. We pride ourselves in accommodating even the most trying circumstances to preserve the record and produce a verbatim and timely transcription. We have given your request a great deal of thought, evaluation, and comparison to present circumstances and we regret to tell you that we have come to the same conclusion: We don't feel we can ensure that the quality of the record will be such that it can be officially certified by our licensed associate court reporters.

Respectfully,

ARIZONA REPORTING SERVICE, INC.

A handwritten signature in black ink that reads "Marta T. Hetzer." The signature is fluid and cursive, with a period at the end.

Marta T. Hetzer  
Administrator / Owner

Copy to: e-mail and First Class Mail  
Michael P. Kearns, ACC, Interim Executive Director  
Lyn Farmer, ACC, Chief Administrative Law Judge  
Janice Alward, ACC, Chief Counsel

**From:** Tara Williams  
**To:** Webb, Elizabeth  
**Date:** 6/1/2009 12:07 PM  
**Subject:** Transcript  
**Attachments:** pre-hearing.pdf

Ms. Webb,

Per your request, please see attached.

Thank you,  
Tara Williams  
Assistant  
Consumer Protection & Advocacy Section  
Office of the Attorney General  
Tel: (602) 542-7759  
Fax: (602) 542-4377  
tara.williams@azag.gov

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**From:** "Mary Ippolito" <mippolito@rdp-law.com>  
**To:** "Tara Williams" <Tara.Williams@azag.gov>  
**Date:** 6/1/2009 12:58 PM  
**Subject:** RE: Court Reporter

Thanks!

Mary Ippolito  
Roshka DeWulf & Patten PLC  
400 East Van Buren, Suite 800  
Phoenix, Arizona 85004  
(602) 256-6100 telephone  
(602) 256-6800 fax  
mippolito@rdp-law.com

-----Original Message-----

From: Tara Williams [mailto:Tara.Williams@azag.gov]  
Sent: Monday, June 01, 2009 12:58 PM  
To: Mary Ippolito  
Subject: Re: Court Reporter

Okay, I will.

Thank you,  
Tara Williams  
Assistant  
Consumer Protection & Advocacy Section  
Office of the Attorney General  
Tel: (602) 542-7759  
Fax: (602) 542-4377  
tara.williams@azag.gov

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>>> "Mary Ippolito" <mippolito@rdp-law.com> 6/1/2009 12:56 PM >>>  
Tara

I just received a call from Kathy - she is checking one thing before she can commit to having a court reporter there. Please hold off on informing Chairman Foreman until you hear from me. THX

Mary Ippolito  
Roshka DeWulf & Patten PLC  
400 East Van Buren, Suite 800  
Phoenix, Arizona 85004  
(602) 256-6100 telephone  
(602) 256-6800 fax  
mippolito@rdp-law.com

**From:** "Mary Ippolito" <mippolito@rdp-law.com>  
**To:** "Tara Williams" <Tara.Williams@azag.gov>  
**Date:** 6/1/2009 2:19 PM  
**Subject:** RE: Court Reporter

Thanks!!

Mary Ippolito  
Roshka DeWulf & Patten PLC  
400 East Van Buren, Suite 800  
Phoenix, Arizona 85004  
(602) 256-6100 telephone  
(602) 256-6800 fax  
mippolito@rdp-law.com

-----Original Message-----

From: Tara Williams [mailto:Tara.Williams@azag.gov]  
Sent: Monday, June 01, 2009 2:19 PM  
To: Mary Ippolito  
Subject: RE: Court Reporter

Thank you, Mary. I'll do that right now.

Thank you,  
Tara Williams  
Assistant  
Consumer Protection & Advocacy Section  
Office of the Attorney General  
Tel: (602) 542-7759  
Fax: (602) 542-4377  
tara.williams@azag.gov

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>>> "Mary Ippolito" <mippolito@rdp-law.com> 6/1/2009 2:17 PM >>>  
Tara

Just to confirm - the Court Reporter is in place.

Please call or have Chairman Foreman call Kathy at Garcia Court Reporting Service (520) 884-4365 to make final arrangements. The name of the Court Reporter will be Diane Laur.

Please provide her with: the route of the tour, time, place, where to send the bill, etc.

If you need any assistance, please let me know.

Mary Ippolito  
Roshka DeWulf & Patten PLC  
400 East Van Buren, Suite 800  
Phoenix, Arizona 85004  
(602) 256-6100 telephone  
(602) 256-6800 fax  
mippolito@rdp-law.com

**From:** "Marshall Magruder" <mmagruder@earthlink.net>  
**To:** "John Foreman" <John.Foreman@azag.gov>  
**Date:** 6/1/2009 2:47 PM  
**Subject:** FW: An Idea for the tour -Court Reporters Attendance at Committee Tours of Sites re Line Siting #144

**CC:** "Tara Williams(ATGen)" <tara.williams@azag.gov>  
Chairman Foreman:

The below was sent prior to reading your email concerning the court reporter situation for the tour. I have called our county court and supervisor's offices and I have one person who knows someone else who does Gregg's shorthand. If that person is available, I will have her call your office direct at your number below as any follow-on should not involve me. If you don't receive a call in next hour, then the local court reporter was unable to find a suitable person. It should be less expensive using someone from Nogales than elsewhere.

Sincerely,

Marshall Magruder

----- Forwarded Message

From: Marshall Magruder <mmagruder@earthlink.net>  
Date: Mon, 01 Jun 2009 11:57:16 -0700  
To: "Tara Williams(ATGen)" <tara.williams@azag.gov>  
Cc: Marshall Magruder <marshall@magruder.org>, "Jason Gellman(TEP)" <jgellman@rdp-law.com>, <mderstine@rdp-law.com>, "M (TEP) Ippolito" <mippolito@rdp-law.com>, "Marc Jerden(TEP)" <mjerden@tep.com>, <susan.ellis@azag.gov>, <mkearns@azcc.gov>, E Webb <vailaz@hotmail.com>  
Conversation: An Idea for the tour -Court Reporters Attendance at Committee Tours of Sites re Line Siting #144  
Subject: Re: An Idea for the tour -Court Reporters Attendance at Committee Tours of Sites re Line Siting #144

Ms Williams

Could a stenographer be used to take shorthand that can be read back to the Committee, when appropriate, to ensure an accurate record as the tour progresses? This could later be transcribed into the transcripts. This seems the easiest approach.

Sincerely,

Marshall Magruder

On 6/1/09 11:28 AM, "E Webb" <vailaz@hotmail.com> wrote:

> Hello all,  
>  
> As you know, I am not an attorney so please do not laugh. Just putting it out  
> there before tomorrow and it is just a suggestion. How about a 3rd party  
> recording organization, say wedding- bar mitzva (sp?) video place and then  
> have it entered as the Committee's exhibit? I mean it is a gazillion degrees  
> outside and on a Weds-how many of these events are occurring then? UNS E  
> should be able to hire someone quickly. Also, Arizona Illustrated might have  
> some contact information for videographers. Or, maybe the lawyer types can

> wrangle something up from the A.R.S.  
>  
> Per A.R.S.  
>  
> 40-360.01. Organization and membership of the committee  
>  
> "F. The committee may utilize the staff resources of its constituent agencies  
> as well as necessary consultants. All studies required by the committee shall  
> be conducted as specified by the committee and under its general direction"  
>  
> Elizabeth  
>  
>  
>  
> ,  
> From: John.Foreman@azag.gov  
> To: vailaz@hotmail.com; marshall@magruder.org; jgellman@rdp-law.com;  
> mderstine@rdp-law.com; mippolito@rdp-law.com; mjerden@tep.com  
> CC: Susan.Ellis@azag.gov; Tara.Williams@azag.gov; MKearns@azcc.gov  
> Date: Mon, 1 Jun 2009 10:39:15 -0700  
> Subject: Fwd: Court Reporters Attendance at Committee Tours of Sites re Line  
> Siting #144  
>  
> Parties to #144:  
> Attached is correspondence from the court reporter used by the  
> Commission refusing to report any tour. The late timing of the letter  
> will make it difficult to conduct the tour in this case, but I would  
> like to at least present the option to the Committee members. I would  
> like the Applicant to explore the option of having someone who could  
> take pictures or video and someone who could tape record the spoken  
> words and reduce them to a certified transcript later. The spoken  
> communication at each stop will be carefully controlled, but I cannot  
> see how the tour can have meaning unless some spoken communication takes  
> place. A.R.S. § 40-360.04C requires evidence to be "under oath and  
> before a court reporter." I indicated I will carry a voice recorder as  
> a back-up, but I cannot and should not be the court reporter.  
> The late notice from the court reporter makes putting this together by  
> Wednesday very difficult. I will make a final decision tomorrow at the  
> hearing after consulting the other Committee members about whether we  
> have any tour.  
> If any party has a suggestion about how we can meet the concerns raised  
> by the Commission staff that any oral communication about what is seen  
> on the tour be reported by a court reporter and at the same time avoid  
> the refusal of the court reporter used by the Commission to report any  
> tour, please let me know tomorrow.  
>  
>  
> John Foreman  
> Assistant Arizona Attorney General  
> Chair, Arizona Power Plant and Transmission Line Siting Committee  
> 1275 W. Washington  
> Phoenix, AZ 85007  
> Tel: 602-542-7902  
> FAX: 602-542-4377  
> john.foreman@azag.gov  
>  
> In order to avoid any potential question about an Open Meetings Law



✓

 $\succ$ 

✓

> From: azrs@az-reporting.com

> CC: MKearns@azcc.gov; sbernal@azcc.gov; lfarmer@cc.state.az.us;

> Date: Fri, 29 May 2009 14:56:53 -0700

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> Please see attached letter. We regret not to be

> available to be of service to you and the committee in the manner you are  
> envisioning for your present needs.

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> Respectfully,

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>

> Marta T. Hetzer

>  
>  
>

> Administrator / Owner

>  
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>  
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> \*\*\* Our office hours are  
> Monday through Friday 8:00 a.m. to 6:00 p.m. \*\*\*

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> 502

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> Phoenix, AZ

> 85004-1481

>  
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> VOICE

> 602-274-9944

>

> FAX

> 602-277-4264

>

> TOLL FREE 800-522-8893 -

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> e-mail

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> AZRS and its predecessors have been in operation in Phoenix, Arizona

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> \*\*\*\*\* CAUTION

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----- End of Forwarded Message



Arizona Court Reporters Association

# Arizona Reporting Service, Inc.

## Court Reporting & Videoconferencing Center

e-mail: [azrs@az-reporting.com](mailto:azrs@az-reporting.com)  
[www.az-reporting.com](http://www.az-reporting.com)



Marta T. Hetzer  
Administrator/Owner

Suite 502  
2200 North Central Avenue  
Phoenix, AZ 85004-1481  
MAIN (602) 274-9944  
FAX (602) 277-4264

E-mail and First Class Mail

Friday, May 29, 2009

Chairman John Foreman  
Power Plant and Transmission Line Siting Committee  
c/o The Attorney General's Office  
1275 West Washington Street  
Phoenix, AZ 85007

Re: Court Reporter attendance at Committee Tours of Sites

Dear Chairman Foreman:

We regret to inform you that we are not able to accept assignments to attend and preserve a record at committee tours of sites. We understand and appreciate that at this time your needs include making and preserving a record at these tours and we remain available to be of any assistance to you arranging for the transcription, by a certified transcriptionist, of any audio recording you may make at these tours. Perhaps, you might consider accepting our assistance arranging for a videographer; and our offer to arrange for the transcription of the audio would still stand.

In our professional opinion and judgment we are not able to consistently capture a verbatim record and be able to certify the same, with so many variables from event to event and from court reporter to court reporter, all things considered including the elements. We have visited this issue with three of the previous chairpersons of the committee, and each time it was determined that we could not capture, transcribe, and certify a verbatim record.

Page 2 of 2

Friday, May 29, 2009

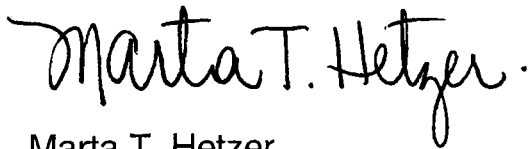
Chairman John Foreman

Re: Court Reporter attendance at Committee Tours of Sites

Our firm and our predecessors have produced transcripts of every Line Siting Committee hearing, going back to Case No. 1. We pride ourselves in accommodating even the most trying circumstances to preserve the record and produce a verbatim and timely transcription. We have given your request a great deal of thought, evaluation, and comparison to present circumstances and we regret to tell you that we have come to the same conclusion: We don't feel we can ensure that the quality of the record will be such that it can be officially certified by our licensed associate court reporters.

Respectfully,

ARIZONA REPORTING SERVICE, INC.

A handwritten signature in black ink that reads "Marta T. Hetzer." The signature is written in a cursive, flowing style.

Marta T. Hetzer  
Administrator / Owner

Copy to: e-mail and First Class Mail  
Michael P. Kearns, ACC, Interim Executive Director  
Lyn Farmer, ACC, Chief Administrative Law Judge  
Janice Alward, ACC, Chief Counsel

**From:** Tara Williams  
**To:** finkreporters@aol.com  
**Date:** 6/1/2009 3:15 PM  
**Subject:** June 3rd Tour  
**Attachments:** List of Possible People in Attendance for the Tour and Caption.doc; Tour Itinerary.doc

Kathy,

Attached is the route for the tour that will be on Wednesday, June 3, 2009. The tour will begin at 8:30 AM on that day. It will start at the Esplendor Resort in Rio Rico, 1069 Camino Caralampi.

I have also attached a list of people who will possibly attend the tour along with the caption for the beginning of the transcript, including the docket number.

If you have any other questions, please contact me.

Thank you,  
Tara Williams  
Assistant  
Consumer Protection & Advocacy Section  
Office of the Attorney General  
Tel: (602) 542-7759  
Fax: (602) 542-4377  
tara.williams@azag.gov

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**VAIL TO VALENCIA TOUR ITINERARY**  
**June 3, 2009**

**Esplendor Resort**

- Start at Esplendor Resort at Rio Rico, 1069 Camino Caralampi, Rio Rico 85648
- Take I-19 to Mariposa Rd Exit
- Take Mariposa east to N. Congress Drive and the County Complex

**Stop #1 – County Complex**

- County Complex viewing area. Existing line north and south. Short line segment requiring wider corridor.
- Return to Mariposa Road and drive east to Mastick Way.
- Turn south on Mastick Way to White Park Rd..

**Valencia Substation**

- Turn east on White Park Road traveling past Valencia Substation on the north side of the road to Grand Ave.
- Turn north on Grand Ave. to Baffert Dr.

**Stop #2 – Baffert Drive**

- East on Baffert Dr. to crossing of alternative route.

**Stop #3 – Grand Avenue**

- Return to Grand Ave. North. Viewing area of existing route just off Grand Ave near the CEC sign.
- Return to Grand Ave. North to Gold Hill Rd. East on Gold Hill Rd to CEC sign.

**Stop #4 – Warehouse**

- Stop at warehouse parking lot on the south side of Gold Hill Rd.

**Gold Hill Road**

- Continue east on Gold Hill Rd. past CEC sign to next turn-around opportunity. Opportunity to view alternative as you cross over.

**Stop #5 – Old Tucson Road**

- Return to Grand Ave. Proceed north to Old Tucson Rd.
- Stop at CEC sign.
- Return to Grand Ave. and head to I-19 Frontage Road. Head north on the Frontage Rd. to the other end of Old Tucson Rd. Turn right onto Old Tucson Rd. heading south to River Rd. Head east and turn left onto Via Frontera on the way to Ruby Rd.

**Stop #6 – Ruby Road**

- Head west on Ruby Road. Stop at CEC sign.
- Continue east to Pendleton Dr.
- Turn north/west on Pendleton Dr.
- Continue north on Pendleton to Avenida Coatimundi

**Stop #7 – Sonoita Substation**

- Turn east on Avenida Coatimundi to Sonoita Substation. Stop at Sonoita Substation.
- Return to Pendleton.
- Turn right on Willow Drive (observe encroachments), proceed east and then north along Willow drive to Rio Rico Drive)
- Turn West on Rio Rico Drive (observe alignment)
- Return to Pendleton Rd.

**Stop #8 – Canez Substation**

- Proceed north on Pendleton Rd to Canez Substation. Stop at Canez Substation.
- Continue North on Pendleton Rd past CEC sign to the dirt road opposite Avenida Ostion.

**Stop #9 – Dirt Road Access to Preferred Alignment**

- Proceed west on dirt road to railroad alignment. Stop at railroad.
- Return to Pendleton Dr and head south to Rio Rico Dr.
- Head west to I-19

**Stop #10 – Kantor Substation**

- Head North on I-19 to Agua Linda Rd exit, head north on frontage road to Amado Montosa Rd.
- Head east to CEC sign and turn south to Kantor Substation. Stop at Kantor Substation.

**Stop #11**

- Return to I-19, head North to Sahuarita Rd. exit
- Head east to Wilmot Rd
- Turn North along Wilmot Rd. to Sign at Southern alternative to Vail Substation. Stop at CEC sign.

**Stop #12**

- Continue North to Nogales Tap Substation. Stop at Nogales Tap.

**Stop #13**

- Continue North to crossing of Old Vail Connection Road. Stop at Old Vail Connection Rd.
- Return to Esplendor Resort at Rio Rico.



## **List of Possible People in Attendance for the Tour**

### **Committee:**

JOHN FOREMAN, Committee Chairman  
DAVID L. EBERHART, Arizona Corporation Commission  
PAUL W. RASMUSSEN, Department of Environmental Quality  
JESSICA YOULE, Department of Commerce Energy Office  
PATRICIA A. NOLAND, Appointed Member  
JEFF McGUIRE, Appointed Member  
MIKE WHALEN, Appointed Member  
MIKE PALMER, Appointed Member  
BARRY WONG, Appointed Member

### **For UNS Electric:**

ROSHKA, DeWULF & PATTEN, PLC  
Mr. J. Matthew Derstine  
Mr. Michael W. Patten  
Mr. Jason D. Gellman  
400 East Van Buren Street, Suite 800  
Phoenix, Arizona 85004

UNISOURCE ENERGY SERVICES  
Mr. Marc Jerden, Senior Legal Counsel  
One South Church Avenue, Suite 200  
Tucson, Arizona 85702

### **Possible other Attendees/Witnesses:**

Mr. Erik Bakken, UNS Electric, Inc.  
Mr. Ed Beck, UNS Electric, Inc.  
Mr. Mike Warner, Transcon Environmental, Inc., UNS Electric, Inc.  
Mr. George Miller, Transcon Environmental, Inc., UNS Electric, Inc.

### **Potential Intervenors (May Participate)**

Mr. Marshall Magruder  
P.O. Box 1267  
Tubac, Arizona 85646

Ms. Elizabeth Buchroeder-Webb:  
17451 East Hilton Ranch Road  
Vail, Arizona 85641

**Heading:**

BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION  
LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION )  
OF UNS ELECTRIC, INC., IN )  
CONFORMANCE WITH THE REQUIREMENTS )  
OF ARIZONA REVISED STATUTES )  
§§ 40-360, et seq., FOR A )  
CERTIFICATE OF ENVIRONMENTAL )  
COMPATIBILITY AUTHORIZING THE )  
CONSTRUCTION OF THE VAIL TO )  
VALENCIA 115kV TO 138kV )  
TRANSMISSION LINE UPGRADE )  
PROJECT, ORIGINATING AT THE )  
EXISTING VAIL SUBSTATION IN SEC. )  
4, T.16S., R.15E., PIMA COUNTY, )  
TO THE EXISTING VALENCIA )  
SUBSTATION IN SEC. 5, T.24S., )  
R.14E., IN THE CITY OF NOGALES, )  
SANTA CRUZ COUNTY, ARIZONA. )

DOCKET NO.  
L-00000F-09-0190-00144

CASE NO. 144

At: Rio Rico, Arizona  
Date: June 3, 2009  
Filed:  
REPORTER'S TRANSCRIPT OF PROCEEDINGS

BE IT REMEMBERED that the above-entitled and numbered matter came  
on regularly to be heard before the Power Plant and Transmission  
Line Siting Committee, at the (location name and address)  
commencing at (time) a.m. on the (date) day of (month), 2009.

**From:** "Mary Ippolito" <mippolito@rdp-law.com>  
**To:** "Tara Williams" <Tara.Williams@azag.gov>  
**Date:** 6/2/2009 1:44 PM  
**Subject:** RE: Vail to Valencia Map

You're welcome.

Mary Ippolito  
Roshka DeWulf & Patten PLC  
400 East Van Buren, Suite 800  
Phoenix, Arizona 85004  
(602) 256-6100 telephone  
(602) 256-6800 fax  
mippolito@rdp-law.com

-----Original Message-----

From: Tara Williams [mailto:Tara.Williams@azag.gov]  
Sent: Tuesday, June 02, 2009 1:41 PM  
To: Mary Ippolito  
Subject: Re: Vail to Valencia Map

Thank you Mary. I'll take that over to Mr. Kearns' office with the itinerary.

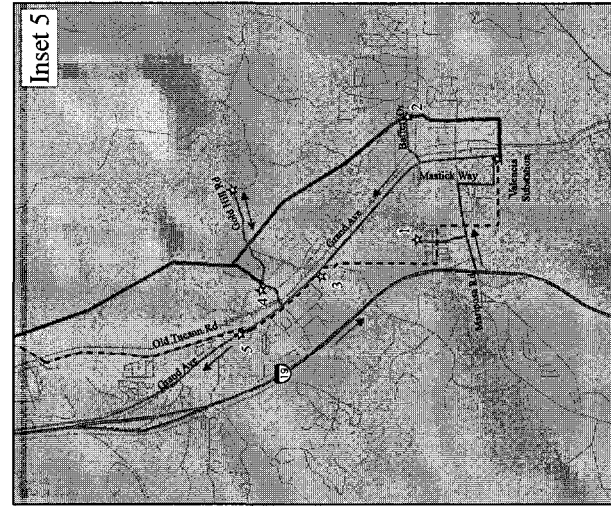
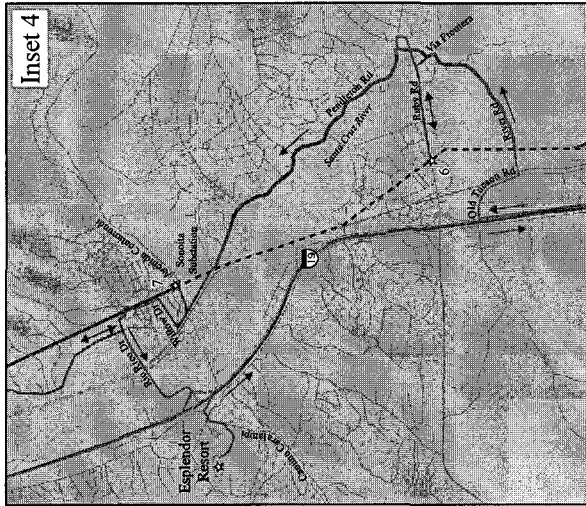
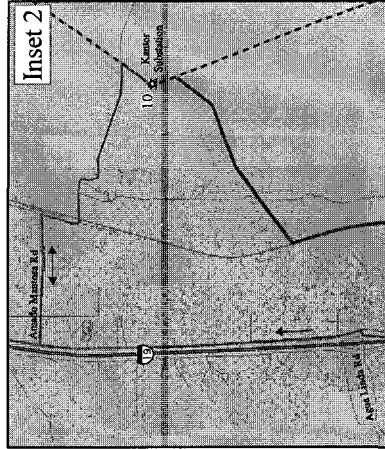
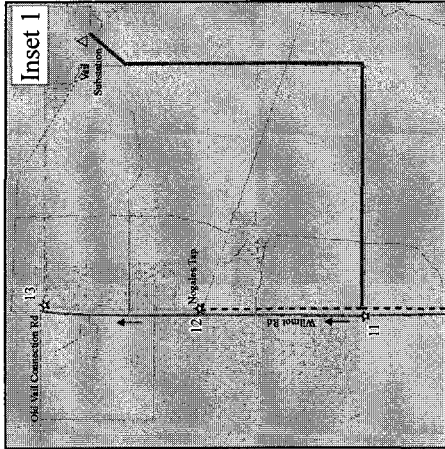
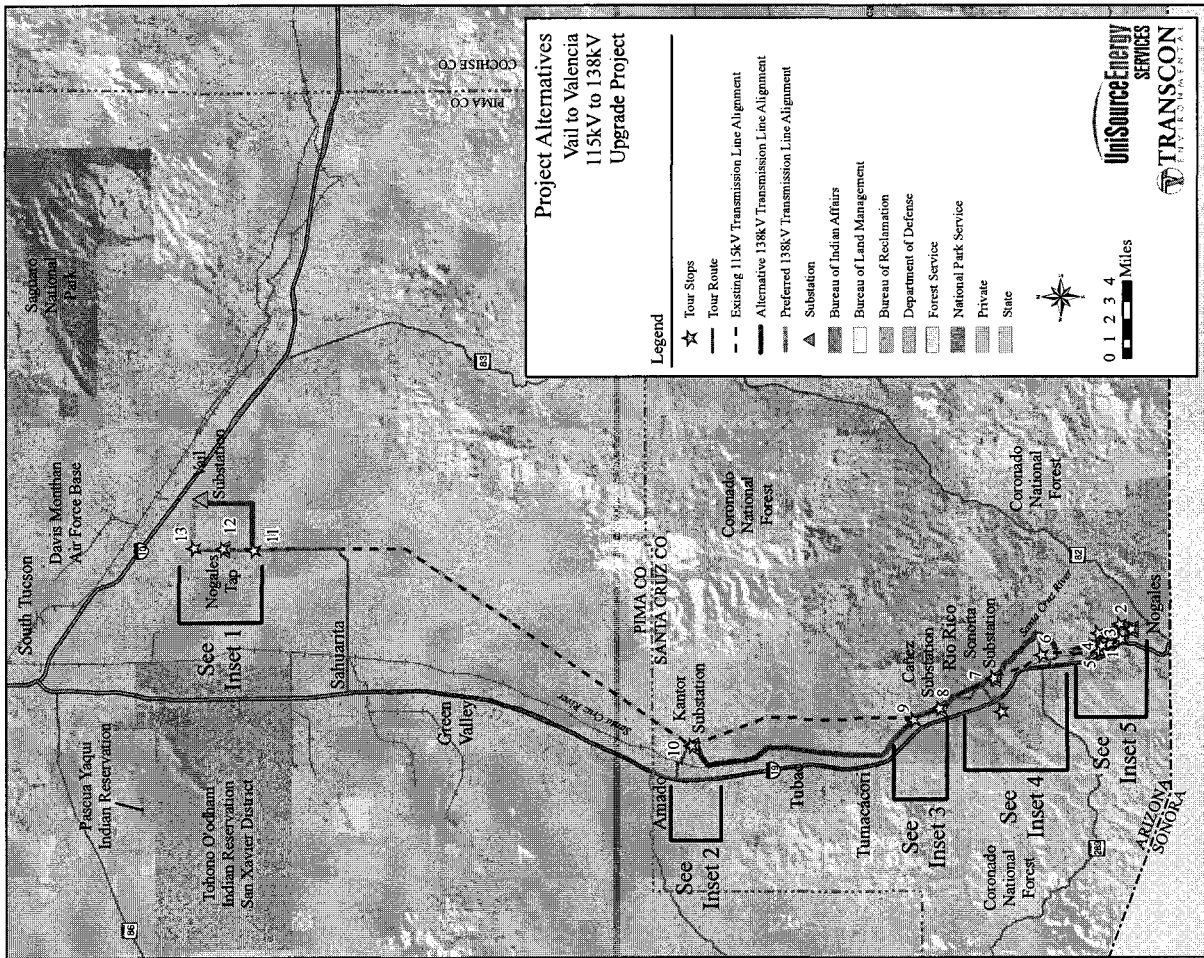
Thank you,  
Tara Williams  
Assistant  
Consumer Protection & Advocacy Section  
Office of the Attorney General  
Tel: (602) 542-7759  
Fax: (602) 542-4377  
tara.williams@azag.gov

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>>> "Mary Ippolito" <mippolito@rdp-law.com> 6/2/2009 1:39 PM >>>  
Tara

Att'd is the map that was sent to me for the tour tomorrow. If I can help in any other way, let me know.

Mary Ippolito  
Roshka DeWulf & Patten PLC  
400 East Van Buren, Suite 800  
Phoenix, Arizona 85004  
(602) 256-6100 telephone  
(602) 256-6800 fax  
mippolito@rdp-law.com



**From:** "Vail Arizona" <vailaz@hotmail.com>  
**To:** "Jason Gellman(TEP)" <jgellman@rdp-law.com>, "M (TEP) Patten " <mpatten@...  
**Date:** 6/5/2009 2:28 PM  
**Subject:** Next Evidentiary Hearing Time and Location for LS case 144

Hello all,

Just checking in with dates that are good for me for the next scheduled evidentiary hearing. Anything, unless an emergency occurs should be fine. Please let me know as soon as possible though.

This past weekend was the one in which my store closed its doors and I've already canceled a family trip due to finances associated with the proceeding so I appreciate the effort I know will be put into finding a location on the SE side of Phoenix. Every little bit helps.

Thanks,

Elizabeth

**From:** "Marshall Magruder" <mmagruder@earthlink.net>  
**To:** "Tara Williams(ATGen)" <tara.williams@azag.gov>  
**Date:** 6/5/2009 2:45 PM  
**Subject:** Case 144 - Availability for Next Line Siting Meeting

**CC:** "Jason Gellman(TEP)" <jgellman@rdp-law.com>, "M (TEP) Patten" <mpatten@r...  
Ms Williams -

FYI, on the the following dates, I are not available:

23-24 June - ACC Open Meeting

25 June - 6 July - reservations made with plans to visit my 92-yo mother,  
postponed many times since last October

Sincerely,

Marshall Magruder  
PO Box 1267  
Tubac, AZ 85646  
marshall@magruder.org  
520.398.8587